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of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

May 16, 1978

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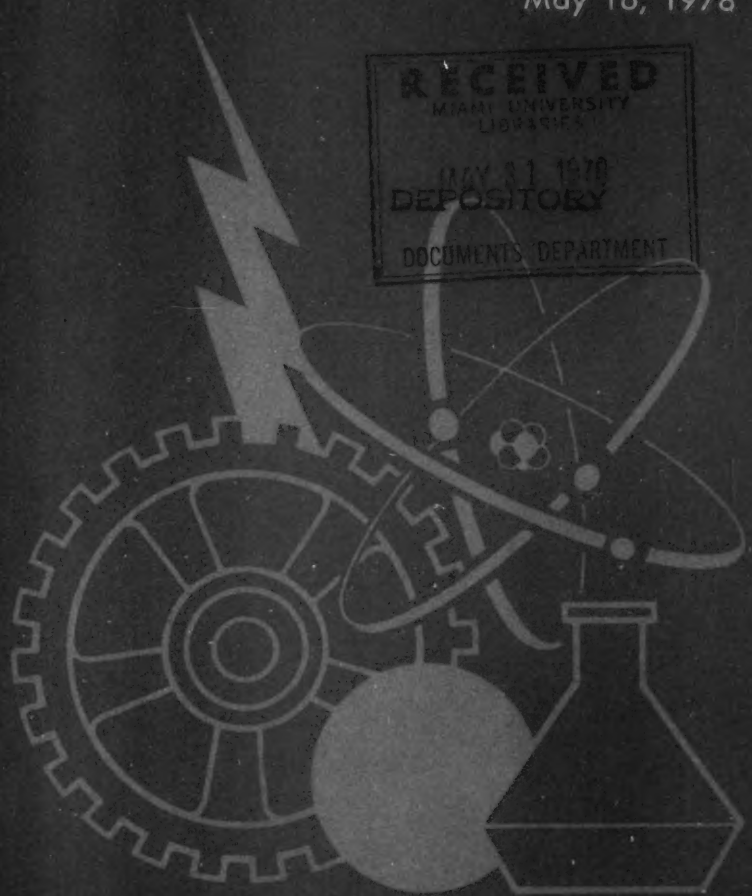

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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Implementation: Information for Prospective Applicants

International applications under the Patent Cooperation Treaty (PCT) may be filed with the Patent and Trademark Office beginning on 01 June 1978. In order to provide prospective applicants with information necessary for filing and to advise on the availability of various documents covering the requirements and procedures under the PCT, the following topics are included in this Notice:

I. Amendments to the Regulations under the Patent Cooperation Treaty.
II. Administrative Instructions under the Patent Cooperation Treaty.
III. Fees for the processing of International Applications.
IV. PCT Member States which may be designated in International Applications.
V. Availability of Documents concerning the Patent Cooperation Treaty.

A revision of pertinent parts of Title 37 of the Code of Federal Regulations incorporating changes necessary to implement the Patent Cooperation Treaty will be published in the near future.

TOPIC I: AMENDMENTS TO THE REGULATIONS UNDER THE PATENT COOPERATION TREATY (PCT)

The PCT Assembly at its first meeting on April 10–14, 1978 adopted several changes to the PCT Regulations. These changes are reproduced below so that prospective applicants who already have copies of the Treaty may incorporate the changes. To obtain copies of the Treaty, including the changes to the Regulations, see Topic V of this Notice.

AMENDMENTS TO THE REGULATIONS UNDER THE PATENT COOPERATION TREATY (PCT)

Adopted by the Assembly of the International Patent Cooperation (PCT) Union on April 14, 1978

TABLE OF AMENDMENTS

Rule 4.4(c)	Amended
Rule 4.10(d)	Amended
Rule 11.6(a)	Amended
Rule 11.6(b)	Amended
Rule 11.13(a)	Amended
Rule 15.2(a)	Amended
Rule 15.2(b)	Amended
Rule 32*bis*.1	New rule added
Rule 48.2(a)	Amended
Rule 48.3(c)	Amended
Rule 57.2(a)	Amended
Rule 57.2(b)	Amended
Rule 58.2	New rule added
Rule 58.3	New rule added
Rule 61.1(b)	Amended
Rule 74*bis*.1	New rule added
Rule 86.3(a)	Amended
Rule 86.3(b)	New rule added
Rule 86.4(a)	Amended
Rule 86.4(b)	New rule added

RULE 4

The Request (Contents)

4.4 *Names and Addresses*

(c) Addresses shall be indicated in such a way as to satisfy the customary requirements for prompt postal delivery at the indicated address and, in any case, shall consist of all the relevant administrative units up to, and including, the house number, if any. Where the national law of the designated State does not require the indication of the house number, failure to indicate such number shall have no effect in that State. It is recommended to indicate any telegraphic and teleprinter address and telephone number.

4.10 *Priority Claim*

(d) If the filing date of the earlier application as indicated in the request does not fall within the period of one year preceding the international filing date, the receiving Office, or, if the receiving Office has failed to do so, the International Bureau, shall invite the applicant to ask either for the cancellation of the declaration made under Article 8(1) or, if the date of the earlier application was indicated erroneously, for the correction of the date so indicated. If the applicant fails to act accordingly within 1 month from the date of the invitation, the declaration made under Article 8(1) shall be cancelled ex officio. The receiving Office effecting the correction or cancellation shall notify the applicant accordingly and, if copies of the international application have already been sent to the International Bureau and the International Searching Authority, that Bureau and that Authority. If the correction or cancellation is effected by the International Bureau, the latter shall notify the applicant and the International Searching Authority accordingly.

RULE 11

Physical Requirements of the International Application

11.6 *Margins*

(a) The minimum margins of the sheets containing the request, the description, the claims, and the abstract, shall be as follows:

top: 2 cm
left side: 2.5 cm
right side: 2 cm
bottom: 2 cm

(b) The recommended maximum, for the margins provided for in paragraph (a), is as follows:

top: 4 cm
left side: 4 cm
right side: 3 cm
bottom: 3 cm

11.13 *Special Requirements for Drawings*

(a) Drawings shall be executed in durable, black, sufficiently dense and dark, uniformly thick and well-defined, lines and strokes without colorings.

RULE 15

The International Fee

15.2 *Amounts*

(a) The amount of the basic fee shall be:

(i) if the international application contains not more than 30 sheets: US $165.00 or 300 Swiss francs.

(ii) if the international application contains more than 30 sheets: US $165.00 or 300 Swiss francs plus US $3.00 or 6 Swiss francs per sheet in excess of 30 sheets.

(b) The amount of the designation fee for each designated State or each group of designated States for which the same regional patent is sought shall be: US $40.00 or 80 Swiss francs.

RULE 32bis

Withdrawal of the Priority Claim

32*bis*.1 *Withdrawals*

(a) The applicant may withdraw the priority claim made in the international application under Article 8(1) at any time before the international publication of the international application.

(b) Where the international application contains more than one priority claim, the applicant may exercise the right provided for in paragraph (a) in respect of one or more or all of them.

(c) Where the withdrawal of the priority claim, or, in the case of more than one such claim, the withdrawal of any of them, causes a change in the priority date of the international application, any time limit which is computed from the original priority date and which has not already expired

shall be computed from the priority date resulting from that change. In the case of the time limit of 18 months referred to in Article 21(2)(a), the International Bureau may nevertheless proceed with the international publication on the basis of the said time limit as computed from the original priority date if the withdrawal is effected during the period of 15 days preceding the expiration of that time limit.

(*d*) For any withdrawal under paragraph (*a*), the provisions of Rule 32.1(c) and (d) and Rule 74*bis*.1 shall apply *mutatis mutandis*.

RULE 48

International Publication

48.2 *Contents*

(*a*) The pamphlet shall contain:

(i) a standardized front page,

(ii) the description,

(iii) the claims,

(iv) the drawings, if any,

(v) subject to paragraph (*g*), the international search report or the declaration under Article 17(2)(a); the publication of the international search report in the pamphlet shall, however, not be required to include the part of the international search report which contains only matter referred to in Rule 43 already appearing on the front page of the pamphlet,

(vi) any statement filed under Article 19(1), unless the International Bureau finds that the statement does not comply with the provisions of Rule 46.4.

48.3 *Language*

(*c*) If the international application is published in a language other than English, the international search report to the extent that it is published under Rule 48.2(a)(v), or the declaration referred to in Article 17(2)(a), and the abstract shall be published both in that language and in English. The translations shall be prepared under the responsibility of the International Bureau.

RULE 57

The Handling Fee

57.2. *Amount*

(*a*) The amount of the handling fee shall be US $50.00 or 96 Swiss francs augmented by as many times the same amount as the number of languages into which the international preliminary examination report must, in application of Article 36(2), be translated by the International Bureau.

(*b*) Where, because of a later election or elections, the international preliminary examination report must, in application of Article 36(2), be translated by the International Bureau into one or more additional languages, a supplement to the handling fee shall be payable and shall amount to US $50.00 or 96 Swiss francs for each additional language.

RULE 58

The Preliminary Examination Fee

58.2 *Failure to pay*

(*a*) Where the preliminary examination fee fixed by the International Preliminary Examining Authority under Rule 58.1(b) is not paid as required under that Rule, the International Preliminary Examining Authority shall invite the applicant to pay the fee or the missing part thereof within one month from the date of the invitation.

(*b*) If the applicant complies with the invitation within the prescribed time limit, the preliminary examination fee will be considered as if it had been paid on the due date.

(*c*) If the applicant does not comply with the invitation within the prescribed time limit, the demand shall be considered as if it had not been submitted.

58.3 *Refund*

The International Preliminary Examining Authorities shall inform the International Bureau of the extent, if any, to which, and the conditions, if any, under which, they will refund any amount paid as a preliminary examination fee where the demand is considered as if it had not been submitted under Rule 57.4(c), Rule 58.2(c) or Rule 60.1(c), and the International Bureau shall promptly publish such information.

RULE 61

Notification of the Demand and Elections

61.1 *Notifications to the International Bureau, the Applicant, and the International Preliminary Examining Authority*

(*b*) The International Preliminary Examining Authority shall promptly inform the applicant in writing of the date of receipt of the demand. Where the demand has been considered under Rules 57.4(c), 58.2(c) or 60.1(c) as if it had not been submitted, the International Preliminary Examining Authority shall notify the applicant accordingly.

RULE 74bis

Notification of Withdrawal under Rule 32

74bis.1 *Notification of the International Preliminary Examining Authority*

If, at the time of the withdrawal of the international application or of the designation of all designated States under Rule 32.1, a demand for international preliminary examination has already been submitted and the international preliminary examination report has not yet issued, the International Bureau shall promptly notify the fact of withdrawal, together with the date of receipt of the notice effecting withdrawal, to the International Preliminary Examining Authority.

RULE 86

The Gazette

86.3 *Frequency*

(*a*) Subject to paragraph (*b*), the Gazette shall be published once a week.

(*b*) For a transitional period after the entry into force of the Treaty terminating upon a date fixed by the Assembly, the Gazette may be published at such times as the Director General considers appropriate having regard to the number of international applications and the amount of other material required to be published.

86.4 *Sale*

(*a*) Subject to paragraph (*b*), the subscription and other sale prices of the Gazette shall be fixed in the Administrative Instructions.

(*b*) For a transitional period after the entry into force of the Treaty terminating upon a date fixed by the Assembly, the Gazette may be distributed on such terms as the Director General considers appropriate having regard to the number of international applications and the amount of other material published therein.

TOPIC II: ADMINISTRATIVE INSTRUCTIONS UNDER THE PATENT COOPERATION TREATY

The Administrative Instructions have been established under Article 58(4) and Rule 89 of the Patent Cooperation Treaty by the Director General of the World Intellectual Property Organization and will enter into force on 01 June 1978. The Administrative Instructions comprise 6 parts and a number of Annexes which provide instructions on various processing requirements that are not covered in detail in the Treaty or its Regulations.

A draft of the Administrative Instructions was published in the January 25, 1977 issue of the OFFICIAL GAZETTE (954 O.G. 4, 1362–1411). A number of changes to that draft version have been made and appear in the established final version printed in this Notice. Among these changes are included a renumbering of many sections, establishment of final wording for sections that were marked in the draft as tentative, and changes in the Request and International Search Report forms.

The Administrative Instructions printed in this Notice contain the entirety of Parts 1–6, and the full text of Annexes A–E. Annex F, which contains model copies of all forms for use by International Authorities (over 300 pages), has not been reproduced in full. However, that portion of Annex F containing copies of the four printed forms for use by applicants and Authorities has been reproduced.

From time to time the Administrative Instructions will be amended. Such amendments, and their effective dates, will be published in the OFFICIAL GAZETTE. For the availability of individual copies of the Administrative Instructions and the Request form see Topic V of this Notice.

ADMINISTRATIVE INSTRUCTIONS UNDER THE PATENT COOPERATION TREATY (PCT)

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PART 1

INSTRUCTIONS RELATING TO GENERAL MATTERS

Section 101

Abbreviated Expressions

In these Administrative Instructions:

(i) "Treaty" means the Patent Cooperation Treaty;

(ii) "Regulations" means the Regulations under the Treaty;

(iii) "Article" means an Article of the Treaty;

(iv) "Rule" means a Rule of the Regulations;

(v) "International Bureau" means the International Bureau as defined in Article 2 (xix) of the Treaty;

(vi) "International Authorities" means the receiving Offices, the International Searching Authorities, the International Preliminary Examining Authorities, and the International Bureau.

Section 102

Use of the Forms

(a) The forms annexed to these Administrative Instructions as *Annex F** (hereinafter referred to as "the Forms") are part of these Administrative Instructions.

(b) Subject to paragraph *(c)*, the International Authorities shall use, or require the use of, the mandatory forms specified below:

Forms Required to be Printed under, or Otherwise Provided for, in the Regulations

PCT/RO/101 — Request (including the fee calculation sheet annexed thereto)
PCT/ISA/210 — International Search Report
PCT/IPEA/401 — Demand
PCT/IPEA/409 — International Preliminary Examination Report

Forms for Use by the International Bureau

Forms PCT/IB/301 to 345, with the exception of Form PCT/IB/328.

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* This Annex is published separately; it may be obtained from the International Bureau, upon request, at a price of 40 Swiss francs.

Other Forms

PCT/RO/103**	PCT/ISA/201**	PCT/IPEA/405**
PCT/RO/104*	PCT/ISA/202*	PCT/IPEA/407*
PCT/RO/106*	PCT/ISA/203*	PCT/IPEA/408**
PCT/RO/109*	PCT/ISA/205*	PCT/IPEA/410*
PCT/RO/111*	PCT/ISA/206**	PCT/IPEA/412*
PCT/RO/112*	PCT/ISA/209*	PCT/IPEA/414*
PCT/RO/113*	PCT/ISA/212**	PCT/IPEA/415*
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PCT/RO/123*		
PCT/RO/129*		
PCT/RO/130*		

(c) The obligation of the International Authorities to use, or require the use of, the mandatory Forms is subject to the following provisos:

(i) slight variations in layout necessary in view of the printing of such Forms in various languages are permitted;

(ii) in all Forms, other than those for the request, the international search report, the demand and the international preliminary examination report, slight variations in layout, to the extent necessary to meet the particular office requirements of the International Authorities, are permitted as well;

(iii) where the receiving Office, the International Searching Authority and/or the International Preliminary Examining Authority are each part of the same Office, the obligation to use the mandatory Forms does not extend to communications within that same Office;

(iv) the annexes to Forms PCT/RO/106, PCT/ISA/215 and PCT/IB/313 may be omitted in cases where they are not used;

(v) the mandatory character of the Forms referred to in paragraph *(b)* does not extend to the Notes attached to them.

(d) The use of Forms annexed to these Administrative Instructions other than those referred to in paragraph *(b)* is optional.

Section 103

Languages of the Forms

(a) The language of the Forms used by any receiving Office shall be the same as the language in which the international application is filed, provided that the receiving Office may, in its communications to the applicant, use any other language being one of its official languages.

(b) The language or languages of the Forms to be used by any International Searching Authority shall be specified in the applicable agreement referred to in Article 16(3)*(b)*.

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* Forms for use by receiving Offices, International Searching Authorities and International Preliminary Examining Authorities.

** Forms sent to applicants, on matters subject to review or further processing by International Authorities.

(c) the receiving Office shall, in the case of later submitted sheets received after the expiration of the time limits referred to in Rule 20.2*(a)*(i) and (ii):

(i) notify the applicant of that fact and of the date of receipt of the later submitted sheets;

(ii) where transmittals under Article 12(1) have already been made, forward a copy of the later submitted sheets to the International Bureau with the indication that such sheets are not to be taken into consideration for the purposes of international processing;

(iii) where transmittals under Article 12(1) have not yet been made, attach a copy of the later submitted sheets to the record copy with the indication that such sheets are not to be taken into consideration for the purposes of international processing.

Section 310

Procedure in the Case of Missing Drawings

(a) Where the international application refers to drawings which in fact are not included in that application, the receiving Office shall make the indication referred to in Rule 26.6*(a)* by an appropriate marking of the request Form.

(b) Section 309*(a)* shall apply also in the case of drawings received by the receiving Office on a date later than the date on which sheets were first received by that Office.

(c) The receiving Office shall, in the case of missing drawings received within the time limit referred to in Rule 20.2*(a)*(iii):

(i) effect the required correction of the international filing date, or, where no international filing date has yet been accorded, of the date of receipt of the purported international application, and delete the indication made under paragraph *(a)* above;

(ii) notify the applicant of the correction effected under item (i), above;

(iii) where transmittals under Article 12(1) have already been made, notify the International Bureau and the International Searching Authority of any correction effected under item (i), above, by transmitting a copy of the corrected first page of the request, and forward copies of the later submitted drawings to the said Bureau and the said Authority;

(iv) where transmittals under Article 12(1) have not yet been made, attach a copy of the later submitted drawings to the record copy and the search copy.

(d) The receiving Office shall, in the case of missing drawings received after the expiration of the time limit referred to in Rule 20.2*(a)*(iii):

(i) notify the applicant of the fact and of the date of receipt of the later submitted drawings;

(ii) where transmittals under Article 12(1) have already been made, forward a copy of the later submitted drawings to the International Bureau with the indication that such drawings and any reference to such drawings are not to be taken into consideration for the purposes of international processing;

(iii) where transmittals under Article 12(1) have not yet been made, attach a copy of the later submitted drawings to the record copy with the indication that such drawings and any reference to such drawings are not to be taken into consideration for the purposes of international processing.

Section 108

Correspondence Intended for the Applicant

(a) Any correspondence from an International Authority intended for the applicant, or, in the case of several applicants, the applicants, shall be addressed as follows:

(i) Where the applicant has designated or appointed one agent, correspondence shall be addressed to that agent. Where, in the case of several applicants, the applicants are represented by a common representative or a common agent, correspondence shall be addressed to that representative or that agent.

(ii) Where the applicant has designated several agents in the request, correspondence shall be addressed to the agent first mentioned therein. Where, in the case of several applicants, the applicants have designated several common agents in the request, correspondence shall be addressed to the common agent first mentioned therein.

(iii) Where the applicant has appointed several agents in one or more separate powers of attorney, correspondence shall be addressed to the agent first mentioned in the earliest filed and still valid separate power of attorney. Where, in the case of several applicants, the applicants have appointed several common agents in one or more separate powers of attorney, correspondence shall be addressed to the common agent first mentioned in the earliest filed and still valid separate power of attorney.

(b) Any correspondence from an International Authority to the applicant or his agent shall be marked with the file reference, composed either of letters or numbers, or both, of the applicant or the agent, if so indicated on the request Form, provided this reference does not exceed ten characters.

Section 109

Notification of Authorization or Refusal of Rectification

Any International Authority which authorizes or refuses rectification of obvious errors of transcription under Rule 91 shall promptly inform the applicant of such authorization or refusal and, in the case of refusal, of the reasons therefor.

Section 110

*Dates**

Any date in the international application, or used in any correspondence emanating from International Authorities relating to the international application, shall be indicated by the Arabic number of the day, by the name of the month, and by the Arabic number of the year. The receiving Office, where the applicant has not done so, or the International Bureau, where the applicant has not done so and the receiving Office fails to do so, shall, after or below any date indicated by the applicant in the request, repeat the date, in parenthesis, by indicating it by two-digit Arabic numerals each for the number of the day, for the number of the month and for the last two numbers of the year, in that order and with a period after the digit pairs of the day and of the month (for example, "30 March 1978 (30.03.78)").

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* This system of indication of dates is based on the ICIREPAT standards whereas the ISO standards provide for the reverse sequence of data. If the use of the ISO standards should become more common practice in the industrial property field, this Section will be reviewed.

PART 2

INSTRUCTIONS RELATING TO THE INTERNATIONAL APPLICATION

Section 201

Names of States: Cancellation of Designations

(a) The name of any State referred to in the request shall be indicated either by the full name of the State or by a generally accepted short title which, if the indications are in English or French, shall be as appears in *Annex A*. The receiving Office, or the International Bureau where the receiving Office fails to do so, shall insert, in the appropriate space provided for in the request form, the two-letter country code as appears in *Annex B* (for example, where France is the third designated State in Box V of the request Form, "FR 3. France" or "FR 3. French Republic").

(b) The receiving Office shall cancel *ex-officio* the designation of States other than Contracting States, and inform the applicant promptly of such action.

Section 202

Kind of Protection

(a) Where the applicant wishes his application to be treated in any designated State as an application not for a patent but for the grant of another kind of protection referred to in Article 43, he shall make the indication in the request referred to in Rule 4.12*(a)* by inserting the words "inventor's certificate," "utility certificate," "utility model," "patent of addition," "certificate of addition," "inventor's certificate of addition" or "utility certificate of addition," or their equivalent in the language of the international application, immediately after the indication of the said State.

(b) Where the applicant is seeking two kinds of protection under Article 44, he shall make the indication in the request referred to in Rule 4.12*(b)* by inserting, immediately after the indication of the said State and in the language of the international application, either,

(i) any two of the following terms connected by the word "and": "patent," "inventor's certificate," "utility certificate," "utility model," "patent of addition," "certificate of addition," "inventor's certificate of addition," "utility certificate of addition;" or

(ii) any two of the terms indicated in (i) above, one of them preceded by the word "primarily" and the other by the word "subsidiarily."

Section 203

Regional Patents

Where the applicant wishes to obtain a regional patent in respect of any designated State, he shall make the indication in the request referred to in Rule 4.1*(b)* (iv) by inserting the words "regional patent," or their equivalent in the language of the international application, immediately after the indication of the said State or, where an indication has been made under Section 202, after that indication, provided that:

(i) where Article 4(1) (ii), third clause applies, and not all the States party to the regional treaty have been designated, the international application shall be treated as if all those States had

been designated and as if the designations of all such States contained the said words, whether the said designations contained an indication of the wish to obtain a regional patent or, according to Article 4(1) (ii), fourth clause, are to be treated as containing such indication;

(ii) where the national law of any designated State contains a provision as referred to in Article 45(2), the International Bureau shall, according to Article 4(1)(ii), fourth clause, treat the designation as if it contained the said words even where the applicant failed to indicate them.

Section 204

Headings of the Parts of the Description

The headings referred to Rule 5.1*(c)* should be as follows:

(i) for matter referred to in Rule 5.1*(a)*(i), "Technical Field;"

(ii) for matter referred to in Rule 5.1*(a)*(ii), "Background Art;"

(iii) for matter referred to in Rule 5.1*(a)*(iii), "Disclosure of Invention;"

(iv) for matter referred to in Rule 5.1*(a)*(iv), "Brief Description of Drawings;"

(v) for matter referred to in Rule 5.1*(a)*(v), "Best Mode for Carrying Out the Invention;"

(vi) for matter referred to in Rule 5.1*(a)*(vi), "Industrial Applicability."

Section 205

Numbering of Claims upon Amendment

(a) Any claim submitted after the filing date of the international application and which is not identical with the claims previously appearing in the international application shall, at the choice of the applicant, be submitted either:

(i) as an amended claim, in which case, it shall bear the same number as the previous claim it amends; that number shall be followed by the word "(amended)" or its equivalent in the language of the international application; or

(ii) as a new claim, in which case, it shall bear the next number after the highest previously numbered claim; that number shall be followed by the word "(new)" or its equivalent in the language of the international application.

(b) The deletion of any claim previously appearing in the international application shall be made by indicating the number of the previous claim followed by the word "(cancelled)" or its equivalent in the language of the international application.

Section 206

Common Representative Designated in the Request

If the applicants designate a common representative in accordance with Rule 4.8*(a)*, such common representative shall be indicated on the front page of the request Form. The indication of the common representative shall take the form of a statement designating the named applicant to act as the common representative on behalf of all the applicants.

Section 207

Arrangement of Elements and Numbering of Sheets of the International Application

(a) In effecting the sequential numbering of the sheets of the international application in accordance with Rule 11.7, the elements of the international application shall be placed in the following order: the request, the description, the claims, the abstract, the drawings.

(b) The sequential numbering of the sheets shall be effected by using three separate series of numbering, the first series applying to the request only and commencing with the first sheet of the request, the second series commencing with the first sheet of the description and continuing through the claims until the last sheet of the abstract, and the third series being applicable to the sheets of the drawings only and commencing with the first sheet of the drawings.

PART 3

INSTRUCTIONS RELATING TO THE RECEIVING OFFICE

Section 301

Notification of Receipt of Purported International Application

Any receiving Office may notify the applicant of the receipt of the purported international application. The notification should indicate the date of actual receipt, the international application number of the purported international application referred to in Section 307 and the applicant's file reference, where available, as well as, where useful for purposes of identification, the title of the invention.

Section 302

Notification of Priority Claim Considered Not To Have Been Made

Where, owing to failure to meet the requirements of Rule 4.10*(b)*, the priority claim is, for the purposes of procedure under the Treaty, considered not to have been made, the receiving Office shall indicate that fact in the international application by marking over the box in the request Form which provides for the information concerning the priority claim, the words "NOT TO BE CONSIDERED FOR PCT PROCEDURE" or its equivalent in the language of the international application. The receiving Office shall notify the applicant accordingly. If copies of the international application have already been sent to the International Bureau and the International Searching Authority, the receiving Office shall also notify that Bureau and that Authority.

Section 303

Deletion of Additional Matter in the Request

Where, under Rule 4.17*(b)*, the receiving Office deletes *ex-officio* any matter contained in the request, it shall do so by placing such matter between square brackets and entering the word "DELETED," or its equivalent in the language of the international application, in the right-

hand margin adjacent to the matter so placed between brackets, and shall notify the applicant accordingly. If copies of the international application have already been sent to the International Bureau and the International Searching Authority, the receiving Office shall also notify that Bureau and that Authority.

Section 304

Corrections Submitted to the Receiving Office Concerning Expressions, etc., not to be used in the International Application

Where the applicant submits corrections to the receiving Office aimed at complying with the prescriptions of Rule 9.1, that Office shall, if copies of the international application have not yet been transmitted to the International Bureau and the International Searching Authority, attach copies of such corrections to the international application. If copies of the international application have already been transmitted, the receiving Office shall transmit copies of such corrections to the said Bureau and the said Authority.

Section 305

Identifying the Copies of the International Application

(a) Where, under Rule 11.1*(a)*, the international application has been filed in one copy, the receiving Office shall, after preparing under Rule 21.1*(a)* the additional copies required under Article 12(1), mark,

(i) the words "RECORD COPY" in the upper left-hand corner of the first page of the original copy,

(ii) in the same space on one additional copy, the words "SEARCH COPY," and

(iii) in the same space on the other such copy, the words "HOME COPY," or their equivalent in the language of the international application.

(b) Where, under Rule 11.1*(b)*, the international application has been filed in more than one copy, the receiving Office shall choose the copy most suitable for reproduction purposes, and mark the words "RECORD COPY," in the upper left-hand corner of its first page. After verifying the identity of any additional copies and, if applicable, preparing under Rule 21.1*(b)* the home copy, it shall mark, in the upper left-hand corner of the first page of one such copy, the words "SEARCH COPY," and, in the same space on the other such copy, the words "HOME COPY," or their equivalent in the language of the international application.

Section 306

Change in the Person, Name or Address of the Applicant

Any request for the recording of any changes in the person or name of the applicant referred to in Rule 18.5 or Rule 54.4, or of any change in the address of the applicant shall be signed by the applicant or, if the receiving Office requested such change under Rule 18.5 or Rule 54.4, by the receiving Office. The request shall indicate the name or address of the applicant for which the change is requested.

Section 307

System of Numbering International Applications

Papers purporting to be an international application under Rule 20.1 shall be marked with the international application number, consisting of the letters "PCT," a slant, the two-letter code, as in *Annex B*, indicating the receiving Office, a two-digit indication of the last two numbers of the year in which such papers were first received, a slant and a five-digit number, allotted in sequential order corresponding to the order in which the international applications are received (e.g., "PCT/SU78/00001"). However, if a negative determination is made under Rule 20.7 or a declaration is made under Article 14(4), the letters "PCT" shall be deleted by the receiving Office from the indication of the international application number on any papers marked previously with that number, and the said number shall be used without such letters in any future correspondence relating to the purported international application.

Section 308

Marking of the Sheets of the International Application

(a) The receiving Office shall indelibly mark, so as to admit of direct reproduction in any of the manners set forth in Rule 11.2*(a)*, the international application number referred to in Section 307 in the upper right-hand corner of each sheet of each copy of the purported international application.

(b) The data to be indicated on any replacement sheet under Rule 26.4*(b)* shall be indelibly marked by the receiving Office, so as to admit of direct reproduction in any of the manners set forth in Rule 11.2*(a)*, in the upper right-hand corner of each replacement sheet.

Section 309

Procedure in the Case of Later Submitted Sheets

(a) The receiving Office shall indelibly mark, so as to admit of direct reproduction in any of the manners set forth in Rule 11.2*(a)*, any sheet received on a date later than the date on which sheets were first received with the date on which it received that sheet, inserted immediately below the international application number referred to in Section 307.

(b) The receiving Office shall, in the case of later submitted sheets received within the time limits referred to in Rule 20.2*(a)*(i) and (ii):

(i) effect the required correction of the international filing date, or, where no international filing date has yet been accorded, of the date of receipt of the purported international application;

(ii) notify the applicant of the correction effected under item (i) above;

(iii) where transmittals under Article 12(1) have already been made, notify the International Bureau and the International Searching Authority of any correction effected under item (i) above, by transmitting a copy of the corrected first page of the request, and forward copies of the later submitted sheets to the said Bureau and the said Authority;

(iv) where transmittals under Article 12(1) have not yet been made, attach a copy of the later submitted sheets to the record copy and the search copy.

(c) The language or languages of the Forms to be used by any International Preliminary Examining Authority shall be specified in the applicable agreement referred to in Article 32(3).

(d) The language of any Form used by the International Bureau shall be English where the language of the international application is English, and it shall be French where the language of the international application is French. Where the language of the international application is neither English nor French, the language of any Form used by the International Bureau in its communications to any other International Authority shall be English or French according to the wishes of such Authority, and in its communications to the applicant it shall be English or French according to the wishes of the applicant.

Section 104

Language of Correspondence from the Applicant

(a) The language of any letter from the applicant to the receiving Office shall be the same as the language of the international application to which such letter relates. However, the receiving Office may expressly authorize the use of any other language.

(b) The language of any letter from the applicant to the International Bureau shall be English where the language of the international application is English, and it shall be French where the language of the international application is French. Where the language of the international application is neither English nor French, the language of any letter from the applicant to the International Bureau shall be English or French at the choice of the applicant.

Section 105

Several Applicants

Where any international application indicates as applicants several persons, it shall be sufficient, for the purpose of identifying that application, to indicate, in any Form or correspondence relating to such application, the name of the applicant first named in the request.

Section 106

Common Agent for Several Applicants

In the case of several applicants, any agent designated under Rule 4.7 in the request signed by all the applicants, or appointed under Rule 90.3 in a separate power of attorney signed by all the applicants, shall be considered a common agent.

Section 107

Identification of International Authorities

(a) Whenever the nature of any communication from or to the applicant or from or to any International Authority so permits, any International Authority may be indicated in the communication by the two-letter code as appearing in *Annex B*.

(b) Where the International Authority is a receiving Office, an International Searching Authority or an International Preliminary Examining Authority, indication thereof shall be preceded by the letters "RO," "ISA," or "IPEA," respectively, followed by a slant (e.g., "RO/JA," "ISA/US," "IPEA/SU").

Section 311

Renumbering of Sheets of the International Application

(a) The receiving Office shall, subject to Section 207, sequentially renumber the sheets of the international application when necessitated by the addition of any new sheet, the deletion of entire sheets, a change in the order of the sheets or any other reason.

(b) The sheets of the international application shall be provisionally renumbered in the following manner:

(i) when a sheet is deleted, the receiving Office shall either include a blank sheet with the same number and with the word "deleted," or its equivalent in the language of the international application, below the number, or insert, in brackets, below the number of the following sheet, the number of the deleted sheet with the word "deleted" or its equivalent in the language of the international application;

(ii) when a sheet is substituted, the receiving Office shall write below the number of the new sheet the word "substitute" or its equivalent in the language of the international application;

(iii) when one or more sheets are added, each sheet shall be identified by the number of the preceding sheet followed by an oblique stroke and then by a natural number series, starting always with number one for the first sheet added after an unchanged sheet (e.g., 10/1, 15/1, 15/2, 15/3, etc.). When later additions of sheets to an existing series of added sheets are necessary, an extra digit shall be used for identifying the further additions (e.g., 15/1, 15/1/1, 15/1/2, 15/2, etc.).

(c) In the cases mentioned in (i) and (iii) above, it is recommended that the receiving Office should write, below the number of the last sheet, the total number of the sheets of the international application followed by the words "TOTAL OF SHEETS" or their equivalent in the language of the international application. It is further recommended that, at the bottom of any last sheet added, the words "LAST ADDED SHEET" or their equivalent in the language of the international application should be inserted.

Section 312

Notification of Decision not to Issue Declaration that the International Application is Considered Withdrawn

Where the receiving Office, after having notified the applicant under Rule 29.4 of its intent to issue a declaration under Article 14(4), decides not to issue such a declaration, it shall notify the applicant accordingly.

Section 313

Manner of Making the Necessary Annotations in the Check List

Where, under Rule 3.3*(b)*, the receiving Office itself fills in the check list, that Office shall mark, next to such check list, the words "FILLED IN BY RO," or their equivalent in the language of the international application. Where only some of the indications are filled in by the receiving Office, the said words and each indication filled in by that Office shall be identified by an asterisk.

Section 314

Manner of Indicating Correction of the Priority Date or Cancellation of the Priority Claim

(a) Where, under Rule 4.10*(d)*, the applicant corrects the erroneously indicated filing date of any earlier application, the receiving Office shall enter the corrected date in the request and draw a line through the previously entered date while still leaving it legible.

(b) Where, under Rule 4.10*(d)*, the receiving Office cancels the declaration made under Article 8(1), that Office shall mark over the said declaration the words "CANCELLED ON REQUEST OF APPLICANT" or "CANCELLED EX OFFICIO BY RO," or their equivalent in the language of the international application, as the case may be.

Section 315

Notification of Non-Collection of Record Copy

Where, under Rule 22.2*(d)*, the receiving Office has, in accordance with the applicant's wish, held the record copy at the disposal of the applicant, and the applicant has not collected that copy by the expiration of the time limit for receipt of that copy by the International Bureau, the receiving Office shall notify the applicant accordingly.

Section 316

Procedure in the Case where the International Application Lacks the Prescribed Signature

Where, under Article 14(1)*(a)*(i), the receiving Office finds that any international application is defective in that it lacks the prescribed signature, that Office shall send to the applicant, together with the invitation to correct under Article 14(1)*(b)*, a copy of the request part of the international application. The applicant shall, within the prescribed time limit, return said copy after affixing thereto the prescribed signature.

PART 4

INSTRUCTIONS RELATING TO THE INTERNATIONAL BUREAU

Section 401

Marking of Sheets of the Record Copy

The International Bureau shall, under Rule 24.1, mark the date of receipt of the record copy in the appropriate space on the request Form and place the stamp of the International Bureau in the lower right-hand corner of each sheet of the record copy.

Section 402

Notification of Correction of the Priority Date or Cancellation of the Priority Claim

Where, under Rule 4.10*(d)*, the correction of the priority date or the cancellation of the priority claim is effected by the International Bureau, the manner of indicating the correction or cancellation set forth in Section 314 shall apply *mutatis mutandis*. The receiving Office, in addition to the applicant and the International Searching Authority, shall be notified accordingly by the International Bureau.

Section 403

Transmittal of Protest Against Payment of Additional Fee and Decision Thereon

Where, under Rules 40.2*(c)* or 68.3*(c)*, the International Bureau receives a request from the applicant to forward to any designated or elected Office the texts of both the protest against payment of an additional fee and the decision thereon by the International Searching Authority or the International Preliminary Examining Authority, as the case may be, it shall proceed according to such request.

Section 404

International Publication Number

The International Bureau shall assign to each published international application an international publication number which shall be different from the international application number. The international publication number shall be used on the pamphlet and in the Gazette entry. It shall consist of the two-letter code "WO" followed by a two-digit designation of the last two numbers of the year of publication, a slant, and a serial number consisting of five digits (e.g., "WO78/12345").

Section 405

Special Publication Fee

The special publication fee provided for in Rule 48.4 shall be 200 Swiss francs.

Section 406

Pamphlets

(a) Pamphlets referred to in Rule 48.1 shall be published on a given day of each week.

(b) All pamphlets shall be of A4 size and shall be printed by offset, recto-verso.

(c) The form and particulars of the front page of each pamphlet shall be decided by the Director General.

Section 407

The Gazette

(a) The Gazette referred to in Rule 86 shall be of A4 size and shall be printed by offset, recto-verso.

(b) In addition to the contents specified in Rule 86, the Gazette shall contain, in respect of each published international application, the data indicated in *Annex D*.

(c) The information referred to in Rule 86.1(v) shall be that which is indicated in *Annex E*.

(d) The subscription price of the Gazette shall be as fixed by the Director General*. The price of any single issue of the Gazette shall be as fixed by the Director General*.

Section 408

Priority Application Number

(a) If the application number of the earlier application referred to in Rule 4.10*(c)* (priority application number) is furnished to the International Bureau within the prescribed time limit, that Bureau shall enter the said number in the space provided therefor in the request Form.

(b) If the priority application number is furnished after the expiration of the prescribed time limit, the International Bureau shall indicate, in the international publication, the date on which the said number was furnished, by including on the front page of the pamphlet next to the priority application number the words "FURNISHED LATE ON ... (date)," and their equivalent in the language of the international application, provided that language is French, German, Japanese or Russian.

(c) If the priority application number has not been furnished at the time of the international publication, the International Bureau shall indicate that fact by including on the front page of the pamphlet in the space provided for the priority application number the words "NOT FURNISHED AT TIME OF THIS PUBLICATION," and their equivalent in the language of the international application, provided that language is French, German, Japanese or Russian.

Section 409

Notification of Priority Claim Considered not to have been Made

Where the International Bureau notes that the receiving Office has failed to notify the applicant as provided in Section 302, it shall send a notification to the same effect to the applicant, the receiving Office and the International Searching Authority.

Section 410

Numbering of Sheets of the International Application for Purposes of International Publication

In the course of preparing the international application for international publication, the International Bureau shall sequentially renumber the sheets of the international application only when necessitated by the addition of any new sheet, the deletion of entire sheets or a change in the order of the sheets. Otherwise, the numbering provided under Section 207 shall be maintained.

Section 411

Notification that the Certified Copy of the Priority Document has not been Submitted

Where the time limit under Rule 17.1*(a)* has expired and the International Bureau has not received a certified copy of the priority document, it shall notify the applicant and the designated Offices accordingly.

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* This provision is applicable during the transitional period referred to in Rule 86.4*(b)*.

PART 5

INSTRUCTIONS RELATING TO THE INTERNATIONAL SEARCHING AUTHORITY

Section 501

Corrections Submitted to the International Searching Authority Concerning Expressions, etc., not to be used in the International Application

Where the applicant submits corrections to the International Searching Authority aimed at complying with the prescription of Rule 9.1, that Authority shall transmit copies of such corrections to the receiving Office and the International Bureau.

Section 502

Protest Against Payment of Additional Fee and Decision Thereon

The International Searching Authority shall transmit to the applicant, at the latest, together with the international search report, any decision which it has taken under Rule 40.2*(c)* on the protest of the applicant against the payment of the additional fee. At the same time, it shall transmit to the International Bureau a copy of both the protest and the decision thereon, as well as any request by the applicant to forward the texts of both the protest and the decision thereon to any of the designated Offices.

Section 503

Method of Identifying Documents Cited in the International Search Report

Identification of any document cited in the international search report referred to in Rule 43.5*(b)* shall be made by indicating the following elements in the order in which they are listed:

(a) In the case of any patent document (patent documents being patents within the meaning of Article 2(ii) as well as published applications relating thereto):

(i) the Office that issued the document, by the two-letter code as in *Annex B*;

(ii) the kind of document, by the appropriate symbols as in *Annex C*;

(iii) the number of the document as given to it by the Office that issued it (for Japanese patent documents the indication of the year of the reign of the Emperor must precede the serial number of the patent document);

(iv) the date of publication of the cited patent document as indicated thereon;

(v) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings; and

(vi) the name of the patentee or applicant.

(The following example illustrates the citation of a patent document according to paragraph *(a)* above:

JA, B, 5014535, published 1975, May 28, see column 4, lines 3 to 27, NCR Corporation.)

(b) In the case of any book or other separately issued publication:

(i) the name of the author;

(ii) the title (including, where applicable, the number of the edition and/or volume);

(iii) the year of publication (when this coincides with the year of the international application or of the priority claim, the International Searching Authority shall endeavor to determine the month and, if necessary, the day of publication and to indicate these data in the international search report);

(iv) the name of the publisher;

(v) as far as available, the place of publication (where only the location of the publisher appears on the book or other separately issued publication, then that location shall be indicated as the place of publication); and

(vi) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of a book or other separately issued publication according to paragraph *(b)* above:

H. Walton, "Microwave Quantum Theory," Volume 2, published 1973, by Sweet and Maxwell (London), see pages 138 to 192, especially pages 146 to 148.)

(c) In the case of any article published in a periodical or other serial publication:

(i) the title of the periodical or other serial publication;

(ii) the number of the volume and the date of the issue in which the article appears;

(iii) as far as available, the place of publication (where only the location of the publisher appears in the periodical or other serial publication, then that location shall be indicated as the place of publication);

(iv) the author and the title of the article and the number of the page both on which the article starts and ends; and

(v) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of an article published in a periodical or other serial publication according to paragraph *(c)* above:

IBM Technical Disclosure Bulletin, Volume 17 No. 5, issued 1974 October (Armonk, New York), J. G. Drop, "Integrated Circuit Personalization at the Module Level" see pages 1344 to 1345.)

(d) In the case of abstracts:

(i) the identification of the document containing the abstract in the manner set forth in paragraphs *(a)*, *(b)* and *(c)*, respectively, depending upon whether the abstract is contained in a patent document, in a book or other separately issued publication, or in an article published in a periodical or other serial publication;

(ii) in the case where the abstract is not published together with the full text document which served as its basis, the identification of both abstract and full text document on the basis of whatever bibliographic data may be available in respect thereto.

(The following example illustrates the citation of an abstract according to paragraph *(d)* (ii) above:

Chemical Abstracts, Volume 75, No. 20, issued 1971, November 15 (Columbus, Ohio, U.S.A.), D. I. Shetulov, "Surface Effects During Metal Fatigue," see page 163, column 1, the abstract No. 120718k, Fiz.-Khim. Mekh. Mater. 1971, 7(2), 7-11 (Russ).)

Section 504

Classification of the Subject Matter of the International Application

(a) Where the subject matter of the international application is such that classification thereof requires more than one classification symbol according to the principles to be followed

in the application of the International Patent Classification to any given patent document, the international search report shall indicate all such symbols.

(b) Where any national classification system is used, the international search report may indicate all the applicable classification symbols also according to that system.

(c) Where the subject matter of the international application is classified both according to the International Patent Classification and to any national classification system, the international search report shall, wherever possible, indicate the corresponding symbols of both classifications opposite each other.

Section 505

Indication of Citations of Particular Relevance in the International Search Report

Where any document cited in the international search report is of particular relevance, the special indication required by Rule 43.5*(c)* shall consist of the letter "X" placed next to the citation of the said document.

Section 506

Comments on Draft Translation of the International Application

(a) Where the applicant has made comments, within the time limits fixed by the International Searching Authority, on the draft translation referred to in Rule 48.3*(b)*, that Authority shall notify the applicant whether it has changed the draft translation and, if so, of the changes it has made therein.

(b) Where the applicant submits comments on the draft translation after the expiration of the time limit fixed by the International Searching Authority, and that Authority changes the draft translation, it shall notify the applicant accordingly.

Section 507

Manner of Indicating Certain Special Categories of Documents Cited in the International Search Report

(a) Where any document cited in the international search report refers to an oral disclosure, use, exhibition, or other means referred to in Rule 33.1*(b)*, the separate indication required by that Rule shall consist of the letter "O" placed next to the citation of the said document.

(b) Where any document cited in the international search report is a published application or patent as defined in Rule 33.1*(c)*, the special mention required by that Rule shall consist of the letter "E" placed next to the citation of the said document.

(c) Where any document cited in the international search report is a document which defines the general state of the art, it shall be indicated by the letter "A" placed next to the citation of the said document.

(d) Where any document cited in the international search report is a document whose publication date occurred earlier than the international filing date of the international application, but later than the priority date claimed in that application, it shall be indicated by the letter "P" next to the citation of the said document.

(e) Where any document cited in the international search report is a document whose publication date occurred after the filing date or the priority date of the international application and is not in conflict with the said application, but is cited for the principle or theory underlying the

invention, which may be useful for a better understanding of the invention, or is cited to show that the reasoning or the facts underlying the invention are incorrect, it shall be indicated by the letter "T" next to the citation of the document.

(f) Where in the international search report any document is cited for reasons other than those referred to in the preceding paragraphs, such document shall be indicated by the letter "L" next to the citation of the document.

Section 508

Manner of Indicating the Claims to which the Documents Cited in the International Search Report are Relevant

The claims to which cited documents are relevant shall be indicated by placing in the appropriate column of the international search report:

(i) where the cited document is relevant to one claim, the number of that claim; for example (2) or (17);

(ii) where the cited document is relevant to two or more claims numbered in consecutive order, the numbers of the first and last claims of the series connected by a hyphen; for example, (1-15) or (2-3);

(iii) where the cited document is relevant to two or more claims that are not numbered in consecutive order, the number of each claim placed in ascending order and separated by a comma or commas; for example (1, 6) or (1, 7, 10);

(iv) where the cited document is relevant to more than one series of claims under (ii) above, or to claims of both categories (ii) and (iii) above, the series or individual claim numbers and series placed in ascending order using commas to separate the several series, or to separate the numbers of individual claims and each series of claims; for example, (1-6, 9-10, 12-15) or (1, 3-4, 6, 9-11).

PART 6

INSTRUCTIONS RELATING TO THE INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

Section 601

Determination Whether Applicant is Entitled to make a Demand

(a) Where the International Preliminary Examining Authority finds that the applicant is not entitled under Article 31(2) or, where there are several applicants, that none of the applicants is entitled under Rule 54.2 to make a demand, the International Preliminary Examining Authority shall notify both the applicant or applicants and the International Bureau accordingly.

(b) Where the International Preliminary Examining Authority finds that, in the case of different applicants for different elected States, none of the applicants indicated for the purposes of a given elected State is entitled under Rule 54.3 to make a demand and that therefore the election of that State shall be considered not to have been made, the International Preliminary Examining Authority shall notify accordingly both the applicant or applicants so indicated and the International Bureau.

Section 602

Marking of Replacement Sheets and Renumbering of Sheets of the International Application

(a) The data to be indicated on any replacement sheet according to Rule 66.8*(b)* shall be indelibly marked by the International Preliminary Examining Authority, so as to admit of direct reproduction in any of the manners set forth in Rule 11.2*(a)*, in the upper right-hand corner of each replacement sheet.

(b) Section 311 applies, *mutatis mutandis*, to the renumbering of sheets of the international application.

Section 603

Transmittal of Protest Against Payment of Additional Fee and Decision Thereon

The International Preliminary Examining Authority shall transmit to the applicant, at the latest together with the international preliminary examination report, any decision which it has taken under Rule 68.3*(c)* on the protest of the applicant against payment of the additional fee. At the same time, it shall transmit to the International Bureau a copy of both the protest and the decision thereon, as well as any request by the applicant to forward the texts of both the protest and the decision thereon to any of the elected Offices.

Section 604

Guidelines for Explanations Contained in the International Preliminary Examination Report

Explanations under 70.8 shall clearly point out to which of the three criteria referred to in Article 35(2), taken separately, any cited document is applicable and shall clearly describe, with reference to the cited documents, the reasons supporting the conclusion that any of the said criteria is or is not satisfied.

[Annexes follow]

ANNEX A

Names of States

(Members of the Paris Union as at May 31, 1977)

Short Title	*Full Name*
Algeria	People's Democratic Republic of Algeria
Argentina	Argentine Republic
Australia	Commonwealth of Australia
Austria	Republic of Austria
Bahamas	Commonwealth of the Bahamas
Belgium	Kingdom of Belgium
Benin	People's Republic of Benin
Brazil	Federative Republic of Brazil
Bulgaria	People's Republic of Bulgaria
Cameroon	United Republic of Cameroon
Canada	Canada
Central African Empire	Central African Empire
Chad	Republic of Chad
Congo	People's Republic of the Congo
Cuba	Republic of Cuba
Cyprus	Republic of Cyprus
Czechoslovakia	Czechoslovak Socialist Republic
Denmark	Kingdom of Denmark
Dominican Republic	Dominican Republic
Egypt	Arab Republic of Egypt
Finland	Republic of Finland
France	French Republic
Gabon	Gabonese Republic
German Democratic Republic	German Democratic Republic
Germany, Federal Republic of	Federal Republic of Germany
Ghana	The Republic of Ghana
Greece	Hellenic Republic
Haiti	Republic of Haiti
Holy See	Holy See
Hungary	Hungarian People's Republic
Iceland	Republic of Iceland
Indonesia	Republic of Indonesia
Iran	Empire of Iran
Iraq	Republic of Iraq
Ireland	Ireland
Israel	State of Israel
Italy	Italian Republic
Ivory Coast	Republic of the Ivory Coast
Japan	Japan
Jordan	Hashemite Kingdom of Jordan
Kenya	Republic of Kenya
Lebanon	Lebanese Republic
Libyan Arab Jamahiriya	The Socialist People's Libyan Arab Jamahiriya

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Short Title	*Full Name*
Liechtenstein	Principality of Liechtenstein
Luxembourg	Grand Duchy of Luxembourg
Madagascar	Democratic Republic of Madagascar
Malawi	Republic of Malawi
Malta	Republic of Malta
Mauritania	Islamic Republic of Mauritania
Mauritius	Mauritius
Mexico	United Mexican States
Monaco	Principality of Monaco
Morocco	Kingdom of Morocco
Netherlands	Kingdom of the Netherlands
New Zealand	New Zealand
Niger	Republic of the Niger
Nigeria	Federal Republic of Nigeria
Norway	Kingdom of Norway
Philippines	Republic of the Philippines
Poland	Polish People's Republic
Portugal	Portuguese Republic
Romania	Socialist Republic of Romania
San Marino	Republic of San Marino
Senegal	Republic of Senegal
Socialist Republic of Viet Nam	Socialist Republic of Viet Nam
South Africa	Republic of South Africa
Southern Rhodesia	Southern Rhodesia
Soviet Union	Union of Soviet Socialist Republics
Spain	Spanish State
Sri Lanka	Republic of Sri Lanka
Surinam	Republic of Surinam
Sweden	Kingdom of Sweden
Switzerland	Swiss Confederation
Syria	Syrian Arab Republic
Tanzania	United Republic of Tanzania
Togo	Togolese Republic
Trinidad and Tobago	Republic of Trinidad and Tobago
Tunisia	Republic of Tunisia
Turkey	Republic of Turkey
Uganda	Republic of Uganda
United Kingdom	United Kingdom of Great Britain and Northern Ireland
United States of America	United States of America
Upper Volta	Republic of the Upper Volta
Uruguay	Eastern Republic of Uruguay
Yugoslavia	Socialist Federal Republic of Yugoslavia
Zaire	Republic of Zaire
Zambia	Republic of Zambia

[Annex B follows]

ANNEX B

Code for Identifying States and Organizations*

AR	Argentina
AT	Austria
AU	Australia
BE	Belgium
BG	Bulgaria
BJ	Benin (Dahomey)
BR	Brazil
BS	Bahamas
CA	Canada
CF	Central African Empire
CG	Congo
CH	Switzerland
CI	Ivory Coast
CM	Cameroon
CS	Czechoslovakia
CU	Cuba
CY	Cyprus
DD	German Democratic Republic
DE	Germany, Federal Republic of
DK	Denmark
DO	Dominican Republic
DZ	Algeria
EG	Egypt
ES	Spain
FI	Finland
FR	France
GA	Gabon
GB	United Kingdom
GH	Ghana
GR	Greece
HT	Haiti
HU	Hungary
HV	Upper Volta
ID	Indonesia
IE	Ireland
IL	Israel
IQ	Iraq
IR	Iran
IS	Iceland
IT	Italy
JO	Jordan
JP	Japan
KE	Kenya
LB	Lebanon
LI	Liechtenstein

* The States listed are those which are members of the Paris Union. This code is based upon ICIREPAT recommendations and is valid as of January 1, 1978.

LK	Sri Lanka
LU	Luxembourg
LY	Socialist People's Libyan Arab Jamahiriya
MA	Morocco
MC	Monaco
MG	Madagascar
MR	Mauritania
MT	Malta
MU	Mauritius
MW	Malawi
MX	Mexico
NE	Niger
NG	Nigeria
NL	Netherlands
NO	Norway
NZ	New Zealand
PH	Philippines
PL	Poland
PT	Portugal
RH	Southern Rhodesia
RO	Romania
SE	Sweden
SM	San Marino
SN	Senegal
SR	Surinam
SU	Soviet Union
SY	Syrian Arab Republic
TD	Chad
TG	Togo
TN	Tunisia
TR	Turkey
TT	Trinidad and Tobago
TZ	United Republic of Tanzania
UG	Uganda
US	United States of America
UY	Uruguay
VA	Vatican City State (Holy See)
VN	Viet Nam, Socialist Republic of
YU	Yugoslavia
ZA	South Africa
ZM	Zambia
ZR	Zaire

OA	African Intellectual Property Organization
EP	European Patent Office
WO	International Bureau of WIPO

[Annex C follows]

ANNEX C

Standard Code for Identification of Different Kinds of Patent Documents

Introduction

1. The recommendation provides for groups of letter codes in order to distinguish patent documents. The letter codes also facilitate the storage and retrieval of such documents.

2. If any Office wants to amplify the information contained in the letter code, this letter code may be optionally associated with a numerical code. The meaning of such numerical code should then be defined by each Patent Office availing itself of this option.

3. The code also provides for a letter for non-patent literature documents (N) and for documents to be restricted to the internal use of Patent Offices (X) (e.g., confidential documents, not to be disclosed outside the Office). See in this respect also SI.1 (ICIREPAT Manual pages 4.3.1.1 to 4.3.1.4).

Definitions

4. For the purposes of this recommendation, the expression "patent documents" includes patents for inventions, inventors' certificates, utility certificates, utility models, patents or certificates of addition, inventors' certificates of addition, utility certificates of addition, plant patents and published applications therefor.

5. For the purposes of this recommendation, the term "entry in an official gazette" means at least one comprehensive announcement in an official gazette regarding the making available to the public of the complete text, claims (if any) and drawings (if any) of a patent document.

6. For the purposes of this recommendation, the terms "publication" and "published" are used in the sense of making available

(i) a patent document to the public for inspection or supplying a copy on request

(ii) multiple copies of a patent document produced by printing or like process

Explanation: If, at a particular procedural stage, a copy of the document is first made available to the public for inspection or copying and is then, *a: the same procedural stage*, made available in multiple copies produced by printing or like process, only a single publication is considered to have occured. If, on the other hand, multiple reproduction results from a new procedural stage, this reproduction is considered to be a further publication of the document, even if the texts at the two stages are identical.

7. According to certain national patent laws or regulations, the same patent application may be published at various procedural stages. For the purposes of this recommendation, a publication level is defined as the level corresponding to a procedural stage at which normally a document is published under a given national patent law.

Recommendation

8. It is recommended that the code:

(a) be used for the recording of the "kind of document" in machine-readable data carriers, such as 80-column punched cards, magnetic tapes, aperture cards, etc.;

(b) be used on the first page of patent documents, preferably near the document number, if these have been published in the sense of paragraph 6;

(c) be used in entries in official gazettes or, if all entries in a section of the Gazette relate to the same kind of a document at the beginning of such a section.

(d) be used for the identification of patent documents cited in "Search Reports" and "Lists of References" in patent documents (INID Number 56).

9. *Code*

The Code is subdivided into *mutually exclusive* groups of letters. The groups characterize patent documents and documents specified in paragraph 3. Groups 1-5 comprise one or several letters enabling identification of documents pertaining to different publication levels.

Group 1 Use for primary or major series of patent documents

- A First publication level
- B Second publication level
- C Third publication level

Group 2 Use for secondary series of patent documents

- E First publication level
- F Second publication level
- G Third publication level

Group 3 Use for further series of patent documents, as the special requirements of each Office may be

- H
- I

Group 4 Use for major special types of patent documents

- M Medicament patent documents
- P Plant patent documents

Group 5 Use for utility model documents having a numbering series other than the documents of Group 1

- U First publication level
- Y Second publication level
- Z Third publication level

Group 6 Other (see paragraph 3)

- N Non-patent literature documents
- X Documents restricted to the internal use of Offices

10. It is understood that documents resulting from a patent application and being identified as the major series will fall under Group 1 (e.g. DT Offenlegungsschrift, Auslegeschrift and Patentschrift). However, documents identified as a secondary series will fall under Group 2 (e.g., FR patent of addition under old law, US reissue). In exceptional cases of need for a further series, Group 3 is reserved for such purposes (e.g., US defensive publication). Group 4 applies only, at present, to special documents concerning the medicament patents published in France and the plant patents published in the United States of America. In any country publishing similar documents, Group 4 should then be used.

11. As indicated in paragraph 2, the above letter code may optionally be associated with a numerical code to amplify the information represented by the letter code. For this numerical code only digits 1 to 9 should be used. The significance of this code will be defined by any national Office applying such code and communicated to the International Bureau, which will publicize this

information. The numerical code must always be interpreted in conjunction with the country code and the above letter code.

12. As an appendix to this recommendation a list of patent documents, past and currently published, and intended to be published in the future, divided in accordance with the code, is given.

[Appendices I & II follow]

Original: STAC III No. 43d, expanded to STAC III No. 93a
Adopted by the first session of the PLC.
First amended version adopted by the fifth PLC ordinary session (document IC/PLC/V/11, paragraphs 65 to 68).
Second amended version adopted by the seventh PLC ordinary session (document IC/PLC/VII/16, paragraph 30).
Third amended version adopted by the tenth PLC ordinary session (document IC/PLC/X/11, paragraph 24).

Appendix I

List of Patent Documents, Past and Currently Published, and Intended to be Published in the Future, Divided in Accordance with this Code

Code: A Patent Documents Numbered in Primary or Major Series – First Publication Level

Examples:	Austria	Patent Application published in the sense of paragraph 6(i)
	Belgium	Brevet d'invention/Uitvindingsoctrooi
	Belgium	Brevet de perfectionnement/Verbeteringsoctrooi
	Bulgaria	Opisanie na izobretenie po patent
	Canada	Patent
	Cuba	Patent Application published in the sense of paragraph 6(i)
	Czechoslovakia	Patent Application published in the sense of paragraph 6(i)
	Czechoslovakia	Inventor's Certificate Application published in the sense of paragraph 6(i)
	Denmark	Patent Application published in the sense of paragraph 6(i)
	Egypt	Patent specification
	Europat	Document published after 18 months
	Finland	Patent Application published in the sense of paragraph 6(i)
	France	Brevet d'invention (old law)
	France	Brevet d'invention, première et unique publication
	France	Certificat d'addition à un brevet d'invention, première et unique publication
	France	Certificat d'utilité, première et unique publication
	France	Certificat d'addition à un certificat d'utilité, première et unique publication
	France	Demande de brevet d'invention, première publication
	France	Demande de certificat d'addition à un brevet d'invention, première publication
	France	Demande de certificat d'utilité, première publication
	France	Demande de certificat d'addition à un certificat d'utilité, première publication
	German Democratic Republic	Patentschrift (Ausschliessungspatent), granted in accordance with paragraph 5.1 of the Patent Amendment Act of the German Democratic Republic
	German Democratic Republic	Patentschrift (Wirtschaftspatent), granted in accordance with paragraph 5.1 of the Patent Amendment Act of the German Democratic Republic
	Germany, Federal Republic of	Offenlegungsschrift
	Hungary	Patent Application published in the sense of paragraph 6(i)
	India	Patent specification
	Ireland	Patent specification
	Italy	Brevetto per invenzione industriale
	Japan	Kokai tokkyo koho
	Luxembourg	Brevet d'invention
	Luxembourg	Certificat d'addition à un brevet d'invention
	Netherlands	Ter inzage gelegde octrooiaanvrage
	Norway	Patent Application published in the sense of paragraph 6(i)
	Pakistan	Patent specification

Code: A (continued)

Examples:	PCT	Pamphlet published after 18 months
	Poland	Opis patentovy
	Romania	Descrierea invenţiei
	Soviet Union	Opisanie izobreteniya k patentu
	Soviet Union	Opisanie izobreteniya k avtorskomy svidetelstvu
	Spain	Patente de invención
	Sweden	Patent Application published in the sense of paragraph 6(i)
	Switzerland	Auslegeschrift/Mémoire Exposé/Esposto Memoriale (Patent Application published in the sense of paragraphs 6(i) and 6(ii) pertaining to the technical fields for which search and examination as to novelty are made)
	Switzerland	Patentschrift/Exposé d'invention/Esposto d'invenzione (Patent published in the sense of paragraph 6(ii) and pertaining to the technical fields for which neither search nor examination as to novelty are made)
	United Kingdom	Patent specification
	United States	Patent
	Yugoslavia	Patentni spis

Code: B Patent Documents Numbered in Primary or Major Series – Second Publication Level

Examples:	Australia	Patent specification
	Austria	Patentschrift
	Canada	Reissue
	Cuba	Patente de invención
	Czechoslovakia	Popis vynálezu k patentu
	Czechoslovakia	Popis vynálezu k autorskému osvědčení
	Denmark	Fremlaeggelsesskrift
	Finland	Kuulutusjulkaisu – Utläggningsskrift
	France	Brevet d'invention, deuxième publication de l'invention
	France	Certificat d'addition à un brevet d'invention, deuxième publication de l'invention
	France	Certificat d'utilité, deuxième publication de l'invention
	France	Certificat d'addition à un certificat d'utilité, deuxième publication de l'invention
	German Democratic Republic	Patentschrift (Ausschließungspatent), granted in accordance with paragraph 29 of the Patent Act of the German democratic Republic
	German Democratic Republic	Patentschrift (Wirtschaftspatent), granted in accordance with paragraph 29 of the Patent Act of the German Democratic Republic
	Germany, Federal Republic of	Auslegeschrift
	Hungary	Szabadalmi leiras
	Japan	Tokkyo koho
	Netherlands	Openbaar gemaakte octrooiaanvrage
	Norway	Utlegningsskrift
	Sweden	Utläggningsskrift

Code: B (continued)

Examples:	Switzerland	Patentschrift/Exposé d'invention/Esposto d'invenzione (Patent published in the sense of paragraph 6(ii) and pertaining to the technical fields for which search and examination as to the novelty are made)
	United Kingdom	Amended Patent Specification

Code: C *Patent Documents Numbered in Primary or Major Series – Third Publication Level*

Examples:	Denmark	Patent
	Finland	Patentti – Patent
	Germany, Federal Republic of	Patentschrift
	Netherlands	Octrooi
	Norway	Patent
	Sweden	Patentskrift

Code : E *Patent Documents Numbered in Secondary Series – First Publication Level*

Examples:	France	Certificat d'addition à brevet d'invention (old law)
	United States	Reissue

Code: H *Patent Documents numbered in further series*

Example:	United States	Defensive publication

Code: M *Medicament Patent Documents*

Examples:	France	Brevet spécial de médicament
	France	Addition à un brevet spécial de médicament

Code: P *Plant Patent Documents*

Examples:	United States	Plant patent

Code: U *Utility Model Documents Numbered in Series other than the Documents of Group I – First Publication Level*

Examples:	Germany, Federal Republic of	Gebrauchsmuster
	Japan	Kokai jitsuyo shinan koho
	Spain	Utility Model Application published in the sense of paragraph 6(i)

Code: Y *Utility Model Documents Numbered in Series other than the Documents of Group I – Second Publication Level*

Examples:	Japan	Jitsuyo shinan koho
	Spain	Modelo de utilidad

[Appendix II follows]

Appendix II

List of Patent Documents, Past and Currently Published, broken down by issuing country and coded in accordance with the SI.8 Code

Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Australia	Unexamined complete specification open to public inspection (not marked on document)		Unexamined Patent Application published in the sense of paragraph 6(i)	A	
	Patent specification		Patent published in the sense of paragraph 6(ii)	B	
Austria	Aufgebot (not marked on document but indicated as such in the Official Gazette)	Document laid open	Patent Application published in the sense of paragraph 6(i)	A	
	Patentschrift	Patent specification	Patent published in the sense of paragraph 6(ii)	B	
Belgium	Brevet d'invention/ Uitvindingsoctrooi	Patent of invention	Patent published in the sense of paragraph 6(ii)	A	
	Brevet de perfectionnement/ Verbeteringsoctrooi	Patent of improvement	Patent of improvement published in the sense of paragraph 6(ii)	A	
	Brevet d'importation/ Invoeringsoctrooi	Patent of importation	Patent of importation published in the sense of paragraph 6(ii)	A	
Bulgaria	ОПИСАНИЕ НА ИЗОБРЕТЕНИЕ ПО ПАТЕНТ (Opisanie na izobretenie po patent)	Description of invention for a patent	Patent published in the sense of paragraph 6(ii)	A	
	ОПИСАНИЕ НА ИЗОБРЕТЕНИЕ ПО АВТОРСКО СВИДЕТЕЛСТВО (Opisanie na izobretenie po avtorsko svidetelstvo)	Description of invention for an author's certificate	Inventor's certificate published in the sense of paragraph 6(ii)	A	
Canada	Patent/Brevet		Patent published in the sense of paragraph 6(ii)	A	
	Reissue Patent/Brevet de redélivrance		Patent reissued and republished in the sense of paragraph 6(ii)	B	
Cuba	Publicación de la solicitud (not marked on document)	Publication of the application	Patent application published in the sense of paragraph 6(i)	A	
	Patente de invención	Patent of invention	Patent published in the sense of paragraph 6(ii)	B	

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Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Czechoslovakia	Přihláska vynálezu (se žádostí o autorské osvědčedí)	Application for an invention asking for author's certificate	Application for inventor's certificate published in the sense of paragraph 6(i), in accordance with Law No. 84 of 01.11.1972	A	1
	Přihláska vynálezu (se žádostí o patent)	Application for an invention asking for a patent	Patent application published in the sense of paragraph 6(i), in accordance with Law No. No. 84 of 01.11.1972	A	2
	Patentová přihláska or Přihláska vynálezu	Patent application or Application for invention	Patent application published in the sense or paragraph 6(i) up to patent No. 149260 (granted before the entry into force of Law No. 84 of 01.11.1972)	A	5
	Popis vynálezu k autorskému osvědčeni	Description of an invention for an author's certificate	Inventor's certificate published in the sense of paragraph 6(ii), granted in accordance with Law No. 84 of 01.11.1972	B	1
	Popis vynálezu k patentu	Description of an invention for a patent	Patent published in the sense of paragraph 6(ii), granted in accordance with Law No. 84 of 01.11.1972	B	2
	Popis vynálezu k autorskému osvědčeni	Description of an invention for an author's certificate	Dependant author's certificate published in the sense of paragraph 6(ii), granted in accordance with Law No. 84 of 01.11.1972	B	3
	Popis vynálezu k patentu	Description of an invention for a patent	Dependent patent published in the sense of paragraph 6(ii), granted in accordance with Law No. 84 of 01.11.1972	B	4
	Patentový spis	Patent specification	Patent published in the sense of paragraph 6(ii), up to No. 149 260, granted before the entry into force of Law No. 84 of 01.11.1972	B	5
Denmark	Almindeling tilgaengelig patentansøgning	Patent application accessible to the public	Patent application published in the sense of paragraph 6(i)	A	
	Fremlaeggelsesskrift	Document laid open	Patent application published after examination as to novelty in the sense of paragraph 6(ii)	B	

Annex C, page 9

Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Denmark (cont'd)	Patent	Patent	Patent published in the sense of paragraph 6(ii)	C	
Egypt	إدارة براءات الاختراع (Idarat bara'at alikhtirah)	Authority for Patent Delivery	Patent published in the sense of paragraph 6(ii)	A	
Finland	Julkiseksi tullut patenttihakemus (not marked on the document)	Patent application made accessible to the public	Patent application published in the sense of paragraph 6(i)	A	
	Kuulutusjulkaisu – Utläggningsskrift	Document laid open	Patent application published after examination as to novelty in the sense of paragraphs 6(i) and 6(ii)	B	
	Patentti-Patent	Patent	Patent published in the sense of paragraph 6(ii)	C	
France	Demande de brevet d'invention	Application for patent of invention	Patent application, first publication, published in the sense of paragraph 6(ii)	A	1
	Demande de certificat d'addition à un brevet d'invention	Application for a certificate of addition to a patent of invention	Application for a certificate of addition, first publication, published in the sense of paragraph 6(ii)	A	2
	Demande de certificat d'utilité	Application for certificate of utility	Utility certificate application, first publication, published in the sense of paragraph 6(ii)	A	3
	Demande de certificat d'addition à un certificat d'utilité	Application for a certificate of addition to a certificate of utility	Application for a certificate of addition to a utility certificate, first publication, published in the sense of paragraph 6(ii)	A	4
	Brevet d'invention	Patent of invention	Patent, first and only publication, published in the sense of paragraph 6(ii)	A	5
	Certificat d'addition à un brevet d'invention	Certificate of addition to a patent of invention	Certificate of addition to a patent, first and only publication, published in the sense of paragraph 6(ii)	A	6
	Certificat d'utilité	Certificate of utility	Utility certificate, first and only publication, published in the sense of paragraph 6(ii)	A	7

Annex C, page 10

Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
France (cont'd)	Certificat d'addition à un certificat d'utilité	Certificate of addition to a certificate of utility	Certificate of addition to a utility certificate, first and only publication, published in the sense of paragraph 6(ii)	A	8
	Brevet d'invention	Patent of invention	Patent, second publication, published in the sense of paragraph 6(ii)	B	1
	Certificat d'addition à un brevet d'invention	Certificate of addition to a patent of invention	Certificate of addition to a patent, second publication, published in the sense of paragraph 6(ii)	B	2
	Certificat d'utilité	Certificate of utility	Utility certificate, second publication, published in the sense of paragraph 6(ii)	B	3
	Certificat d'addition à un certificat d'utilité	Certificate of addition to a certificate of utility	Certificate of addition to a utility certificate, second publication, published in the sense of paragraph 6(ii)	B	4
	Brevet d'invention	Patent of invention	Patent (old law) published in the sense of paragraph 6(ii)	A	
	Certificat d'addition à un brevet d'invention	Certificate of addition to a patent of invention	Certificate of addition to a patent (old law) published in the sense of paragraph 6(ii)	E	
	Brevet spécial de médicament	Special patent for medicament	Medicament patent (old law) published in the sense of paragraph 6(ii)	M	
	Certificat d'addition à un brevet spécial de médicament	Certificate of addition to a special patent for medicament	Certificate of addition to a medicament patent (old law) published in the sense of paragraph 6(ii)	M	
German Democratic Republic	Patentschrift (Ausschliessungs-patent)	Patent specification (Exclusive Patent)	Exclusive patent, granted in accordance with paragraph 5.1 of the Patent Amendment Act of the German Democratic Republic, published in the sense of paragraph 6(ii)	A	
	Patentschrift (Wirtschaftpatent)	Patent specification (Economic Patent)	Industrial patent, granted in accordance with paragraph 5.1 of the Patent Amendment Act of the German Democratic Republic, published in the sense of paragraph 6(ii)	A	

Annex C, page 11

Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
German Democratic Republic (cont'd)	Patentschrift (Ausschliessungspatent)	Patent specification (Exclusive Patent)	Exclusive patent granted in accordance with paragraph 29 of the Patent Act of the German Democratic Republic, (2nd publication after examination as to novelty whenever this examination is effected), published in the sense of paragraph 6(ii)	B	
	Patentschrift (Wirtschaftspatent)	Patent specification (Economic Patent)	Industrial patent granted in accordance with paragraph 29 of the Patent Act of the German Democratic Republic (2nd publication after examination as to novelty whenever this examination is effected), published in the sense of paragraph 6(ii)	B	
	Berichtigte Patentschrift (Ausschliessungspatent)	Corrected patent specification (Exclusive Patent)	Corrected patent (Exclusive patent) published in the sense of paragraph 6(ii)	C	
	Berichtigte Patentschrift (Wirtschaftspatent)	Corrected patent specification (Economic Patent)	Corrected patent (Industrial patent) published in the sense of paragraph 6(ii)	C	
Germany (Federal Republic of)	Offenlegungsschrift	Document open for inspection	Patent application published, before examination as to novelty, in the sense of paragraph 6(ii)	A	
			– 1st publication	A	1
			– 2nd publication. Modified reprint following A1 Offenlegungsschrift or B1 Auslegeschrift	A	2
			– 3rd publication. Modified reprint following A2 Offenlegungsschrift or B2 Auslegeschrift	A	3
	Auslegeschrift	Document laid open	Patent application published, after examination as to novelty, in the sense of paragraph 6(ii)	B	
			– 1st publication. Offenlegungsschrift not yet published	B	1
			– 2nd publication. Normally following an A1 Offenlegungsschrift or B1 Auslegeschrift	B	2

Annexe C, page 12

Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Germany (Federal Republic of) (cont'd)			– 3rd publication. Following an A2 Offenlegungsschrift or B2 Auslegeschrift	B	3
			– 4th publication. Following an A3 Offenlegungsschrift or B3 Auslegeschrift	B	4
	Patentschrift	Patent specification	Patent published in the sense of paragraph 6(ii)	C	
			– 1st publication. Offenlegungsschrift and Auslegeschrift not published	C	1
			– 2nd publication. Modified reprint normally following a B1 Auslegeschrift or C1 Patentschrift	C	2
			– 3rd publication. Normally following a B2 Auslegeschrift and an A1 Offenlegungsschrift or following a B2 Auslegeschrift with a preceding B1 Auslegeschrift as well	C	3
			– 4th publication. Following a B3 Auslegeschrift or C3 Patentschrift	C	4
			– 5th publication. Following a B4 Auslegeschrift or a C4 Patentschrift	C	5
	Gebrauchsmuster	Utility model	Utility model published in the sense of paragraph 6(ii)	U	
Hungary	Közzétett szabadalmi bejelentés	Published patent application	Patent application published in the sense of paragraph 6(i)	A	
	Szabadalmi leirás	Patent specification	Patent published in the sense of paragraph 6(ii)	B	
India	Patent specification		Patent published in the sense of paragraph 6(ii)	A	
Ireland	Patent specification		Patent published in the sense of paragraph 6(ii)	A	
Italy	Brevetto per invenzione industriale	Patent for industrial invention	Patent published in the sense of paragraph 6(ii)	A	

Annex C, page 13

Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Japan	公開特許公報 (Kokai tokkyo koho)	Preliminary publication of patent	Patent application published before examination as to novelty in the sense of paragraphs 6(i) and 6(ii)	A	
	特許公報 (Tokkyo koho)	Patent publication	Patent application published after examination as to novelty in the sense of paragraphs 6(i) and 6(ii)	B	
	公開実用新案公報 (Kokai jitsuyo shinan koho)	Preliminary publication of Utility Model	Utility model application published before examination as to novelty in the sense of paragraph 6(i)	U	
	実用新案公報 (Jitsuyo shinan koho)	Utility Model publication	Utility model application published after examination as to novelty in the sense of paragraphs 6(i) and 6(ii)	Y	
Luxembourg	Brevet d'invention	Patent of invention	Patent published in the sense of paragraph 6(ii)	A	
	Certificat d'addition à un brevet d'invention	Certificate of addition to a patent of invention	Certificate of addition to a patent published in the sense of paragraph 6(ii)	A	
Monaco	Brevet d'invention	Patent of invention	Patent published in the sense of paragraph 6(ii)	A	
Netherlands	Terinzagelegging	Patent application laid open	Patent application published in the sense of paragraphs 6(i) and 6(ii)	A	
	Openbaarmaking	Published patent application	Patent application published after examination in the sense of paragraphs 6(i) and 6(ii)	B	
	Octrooi	Patent	Patent published in the sense of paragraph 6(ii)	C	
Norway	Alment tilgjengelige patentsöknader (not marked on the document)	Patent application accessible to the public	Patent application published in the sense of paragraph 6(i)	A	
	Utlegningsskrift	Document laid open	Patent application published after examination as to novelty in the sense of paragraph 6(ii)	B	

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Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Norway (cont'd)	Patent	Patent	Patent published in the sense of paragraph 6(ii)	C	
Pakistan	Patent specification		Patent published in the sense of paragraph 6(ii)	A	
Poland			Patent application published in the sense of paragraph 6(i)	A	
	Opis patentowy Patentu tymczasowego	Description of patent	Patent published in the sense of paragraph 6(ii)	B	
Romania	Descrierea invenţiei	Description of the invention	Patent published in the sense of paragraph 6(ii)	A	
Soviet Union	ОПИСАНИЕ ИЗОБРЕТЕНИЯ К ПАТЕНТУ (Opisanie izobreteniya k patentu)	Description of the invention for a patent	Patent published in the sense of paragraph 6(ii)	A	
	ОПИСАНИЕ ИЗОБРЕТЕНИЯ К АВТОРСКОМУ СВИДЕТЕЛЬСТВУ (Opisanie izobreteniya k avtorskomu svidetelstvu)	Description of the invention for an author's certificate	Inventor's certificate published in the sense of paragraph 6(ii)	A	
Spain	Patente de invención	Patent of invention	Patent published in the sense of paragraph 6(i)	A	
	Patente de introducción	Patent of introduction	Patent of importation published in the sense of paragraph 6(i)	A	
	Certificado de adición	Certificate of addition	Certificate of addition published in the sense of paragraph 6(i)	A	
	Solicitud de Modelo de Utilidad	Application for a utility model	Utility Model Application published in the sense of paragraph 6(i)	U	
	Modelo de Utilidad	Utility Model	Utility Model published in the sense of paragraph 6(i)	Y	
Sweden	Allmänt tillgänglig patentansäkan	Patent application accessible to the public	Patent Application published in the sense of paragraph 6(i)	A	
	Utläggningsskrift	Document laid open	Patent Application published after examination as to novelty in the sense of paragraphs 6(i) and 6(ii)	B	

Annex C, page 15

Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
Sweden (cont'd)	Patentskrift	Patent document	Patent published in the sense of paragraph 6(ii)	C	
Switzerland	Auslegeschrift/Mémoire Exposé/Esposto Memoriale	Document laid open	Patent Application published after examination as to novelty in the sense of paragraphs 6(i) and 6(ii), and pertaining to the technical fields for which examination as to novelty is made, issued since 1959	A	4
	Patentschrift/Exposé d'invention/Esposto d'invenzione	Patent specification	Patent published in the sense of paragraph 6(ii) and pertaining to the technical fields for which no examination as to novelty is made, issued since 1959	A	5
	Patentschrift/Exposé d'invention/Esposto d'inventione	Patent specification	Patent published in the sense of paragraph 6(ii) and pertaining to technical fields for which examination as to novelty is made, issued since 1959	B	5
	Patentschrift/Exposé d'invention/Esposto d'invenzione (Hauptpatent/Brevet principal/Brevetto principale)	Patent specification (Main patent)	Patent published in the sense of paragraph 6(ii), issued from 1888 to 1959	A	
	Patentschrift/Exposé d'invention/Esposto d'invenzione (Zusatzpatent/ Brevet additionnel/Brevetto addizionale)	Patent specification (Additional patent)	Patent of addition published in the sense of paragraph 6(ii), issued from 1907 to 1959	A	
	Patentschrift/Exposé d'invention/Esposto d'invenzione (Zusatzpatent/ Brevet additionnel/Brevetto addizionale)	Patent specification (Additional patent)	Patent of addition published in the sense of paragraph 6(ii) in secondary series from 1888 to 1907	E	
United Kingdom	Patent Specification		Examined Patent Application published in the sense of paragraph 6(ii). Grant of letters Patent usually occurs 3 months after publication.	A	

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Issuing country	Kind of published patent document			Letter code	Associated numerical code (when defined)
	Designation in language of issuing country (and, if required, transliteration in Latin characters)	Translation into English (when needed)	Identification of document		
United Kingdom (cont'd)	Amended Patent Specification		Amended Specification of a Granted Patent published in the sense of paragraph 6(ii)	B	
United States	Patent		Patent published in the sense of paragraph 6(ii)	A	
	Reissue Patent		Patent reissued and republished in the sense of paragraph 6(ii)	E	
	Defensive Publication		Patent application published without examination or assertion as to novelty, in the sense of paragraph 6(i)	H	
	Defensive Publication		Patent document published in the sense of paragraph 5: Entry of an abstract of the application in the Official Gazette	H	
	Defensive Publication		Patent document published in the sense of paragraph 6(ii): Abstract of an application published in a discrete document form distinctively numbered in a numerical series unique to Defensive Publications	H	
	Plant Patent		Patent published in the sense of paragraph 6(ii)	P	
Yugoslavia			Accepted Patent Application published in the sense of paragraph 6(i)	A	
	Patentni spis	Patent specification	Patent published in the sense of paragraph 6(ii)	B	

[Annex D follows]

ANNEX D

Information from Pamphlet Front Page to be Included in the Gazette Under Rule 86.1(i)

The following information shall be extracted from the front page of the pamphlet of each published international application and shall, in accordance with Rule 86.1(i), appear in the corresponding entry of the Gazette:

1. as to the international publication:
   - 1.1 the international publication number
   - 1.2 the date of the international publication
   - 1.3 an indication whether the following items were published in the pamphlet:
     - 1.31 international search report
     - 1.32 declaration under Article 17(2)
     - 1.33 amended claims
     - 1.34 statement under Article 19(1)
     - 1.35 the essence of the comments by the applicant on the translation of the international application as referred to in Rule 48.3*(b)*
2. as to the international application:
   - 2.1 the title of the invention
   - 2.2 the symbol(s) of the International Patent Classification (IPC)
   - 2.3 the international application number
   - 2.4 the international filing date

3. as to any priority claim:
   - 3.1 the application number of the earlier application
   - 3.2 the date of the earlier application
   - 3.3 the country in or for which the earlier application was filed

4. as to the applicant, inventor and agent:
   - 4.1 their name(s)
   - 4.2 their mailing address(es)

5. as to the designated and elected States:
   - 5.1 their names
   - 5.2 the indication of any wish for a regional patent
   - 5.3 the indication of kind of protection sought, unless patent is sought.

[Annex E follows]

ANNEX E

Information to be Published in the Gazette Under Rule 86.1(v)

1. The time limits applicable under Articles 22 and 39 in respect of each Contracting State.

2. The list of the non-patent literature agreed upon by the International Searching Authorities for inclusion in the minimum documentation.

3. The names of the national Offices which do not wish to receive copies under Article 13(2) *(c)*.

4. The provisions of the national laws of Contracting States concerning international-type search.

5. The text of the agreements entered into between the International Bureau and the International Searching Authorities or the International Preliminary Examining Authorities.

6. The names of the national Offices which entirely or in part waived their rights to any communication under Article 20.

7. The names of the Contracting States which are bound by Chapter II of the PCT.

8. Index of concordance of international application numbers and international publication numbers, listed according to international application numbers.

9. Index of international publication numbers grouped according to designated States, including an indication of those States for which a "regional patent" is sought.

10. Index of applicants' names giving, for each name, the corresponding international publication number(s).

11. Index of international publication numbers, grouped according to the International Patent Classification symbols.

12. Indication of any subject matter that will not be searched or examined by the various International Searching and Preliminary Examining Authorities under Rules 39 and 67.

[Annex F (Forms) follows]

ANNEX F

Forms

This Annex, which is the final Annex to the Administrative Instructions, contains the Forms referred to in Section 102 of the Administrative Instructions (Forms PCT/RO/101 to 132, PCT/ISA/201 to 228, PCT/IB/301 to 345 and PCT/IPEA/401 to 424).

In view of their special importance, Forms

PCT/RO/101	(Request and Fee Calculation Sheet)
PCT/ISA/210	(International Search Report)
PCT/IPEA/401	(Demand)
PCT/IPEA/409	(International Preliminary Examination Report)

have already been set up in type and appear at the beginning of Annex F and not in the place corresponding to their numerical order in the four different series of Forms.*

In order to facilitate familiarization with the different series of Forms, these series have been reproduced in the colors used previously, except for the four Forms set in type, mentioned above. However, there is no obligation on any International Authority to use any particular color for these Forms, nor any restriction as to the color it may use, except that the request must always be printed on white paper as prescribed by the Regulations.

* Having regard to the separate publication of Annex F mentioned in the footnote to Section 102 of the Administrative Instructions, only the four forms specified in this paragraph are reproduced in this publication.

INTERNATIONAL APPLICATION UNDER THE PATENT COOPERATION TREATY

REQUEST

THE UNDERSIGNED REQUESTS THAT THE PRESENT INTERNATIONAL APPLICATION BE PROCESSED ACCORDING TO THE PATENT COOPERATION TREATY

(The following is to be *filled* in by the receiving Office)
INTERNATIONAL APPLICATION *No*:

INTERNATIONAL FILING DATE:

(Stamp)
Name of receiving Office and "PCT International Application"

Applicant's or Agent's File Reference [9]
(indicated by applicant if desired).

I. TITLE OF INVENTION [1]

II. APPLICANT [2] Additional information is contained in supplemental box. ☐

Name [3, 5]

Address [4, 5] (including postal code and country)

Nationality [5, 6] (country) | Residence [5, 7] (country)

Telephone number (if any) [4] | Telegraphic address (if any) [4, 5] | Teleprinter address (if any) [4, 5]

III. INVENTOR [8] (Applicant is also the inventor ☐) Additional information is contained in supplemental box. ☐

Name [3, 5]

Address [4, 5] (including postal code and country)

IV. AGENT OR COMMON REPRESENTATIVE (IF ANY) [9] Additional information is contained in supplemental box. ☐

A. ☐ Applicant hereby appoints the following named agent or common representative to act on his behalf before the competent International Authorities. [9]

B. ☐ Applicant has appointed the following named agent or common representative in accompanying separate power of attorney. [9]

Name [3, 5]

Address [4, 5] (including postal code and country).

Telephone number (if any) [4] | Telegraphic address (if any) [4, 5] | Teleprinter address (if any) [4, 5]

V. DESIGNATION OF STATES [10] (and possible indication of wish to obtain regional patents) [11] (and possible choice of certain kinds of protection) [12] Additional information is contained in supplemental box. ☐

RO use

Form PCT/RO/101 (first sheet) (April 1978) See notes on accompanying sheet

2

VI. PRIORITY CLAIM (IF ANY) [13] Additional information is contained in supplemental box. ☐

The priority of an earlier application is claimed (indicate following data):

Country (If the earlier application is regional or international application, indicate those countries for which it was filed).	Filing Date [14]
	Application Number [15]
	If a regional or international application, indicate the national Office or intergovernmental organization with which it was filed.

VII. PARENT APPLICATION OR GRANT (IF ANY) [16] Additional information is contained in supplemental box. ☐

Designated State	Type of Treatment Desired	Number and Title of the Parent Application or Grant	Filing Date of the Parent Application or Grant [14]

VIII. EARLIER INTERNATIONAL OR INTERNATIONAL-TYPE SEARCH (IF ANY) [17] Additional information is contained in supplemental box. ☐

An earlier ☐ international or ☐ international-type search has been requested on the following application

Receiving Office/Country	(International) Application No.	(International) Filing Date [14]

Date of Request for the Search where the Earlier Search was an International-Type Search [14]	Number given by the International Searching Authority to the Request for Search where the Earlier Search was an International-Type Search

IX. DIFFERENT APPLICANTS FOR DIFFERENT (GROUPS OF) DESIGNATED STATES (WHERE APPLICABLE) [18]
Additional information is contained in supplemental box. ☐

Designated States	Name of Applicant

X. DIFFERENT INVENTORS FOR DIFFERENT (GROUPS OF) DESIGNATED STATES (WHERE APPLICABLE) [19]
Additional information is contained in supplemental box. ☐

Designated States	Name of Inventor

3

SUPPLEMENTAL BOX... USE THIS BOX IF ANY OF THE BOXES IS NOT LARGE ENOUGH TO CONTAIN INFORMATION TO BE FURNISHED. INDICATE THE BOXES CONTINUED IN THIS BOX BY THEIR (ROMAN) NUMERALS AND TITLE (e.g.: "II. APPLICANT (CONTINUED)")

XI. SIGNATURE OF APPLICANT [20]

XII. CHECK LIST (To be filled in by the Applicant) [21]

A. This international application contains the following number of sheets:

1. request		sheets
2. description		sheets
3. claims		sheets
4. abstract		sheets
5. drawings		sheets
	Total	sheets

C. Figure number ____ of the drawings (if any) is suggested to accompany the abstract for publication.

D. Drawings (To be filled in by the receiving Office)
☐ No Drawings [22]

B. This international application as filed is accompanied by the items checked below:

1. ☐ separate signed power of attorney
2. ☐ priority document
3. ☐ fee calculation sheet (PCT/RO/101 (Annex))
4. ☐ check for the payment of fees
5. ☐ international search report
6. ☐ international-type search report
7. ☐ document in evidence of fact that applicant is successor in title of inventor
8. ☐ other document (specify)

(The following is to be filled in by the receiving Office)

1. Date of actual receipt of the purported international application:

2. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:

3. Date of timely receipt of the required corrections under Article 11 of the PCT:

(The following is to be filled in by the International Bureau)

Date of receipt of the record copy:

Form PCT/RO/101 (last sheet) (April 1978) See notes on accompanying sheet

NOTES TO FORM PCT/RO/101

These Notes are intended to facilitate the filling in of the present form. For full information, see the text of the Patent Cooperation Treaty and the texts of the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and the said texts, the latter are applicable. "Article" refers to Articles of the Treaty, "Rule" refers to Rules of the Regulations and "Section" refers to Sections of the Administrative Instructions.

1 Title of Invention (Rule 4.1 *(a)* (ii))

"The title of the invention shall be short (preferably from two to seven words when in English or translated into English) and precise." **(Rule 4.3)**

2 Applicant (Rule 4.1 *(a)* (iii))

"The request shall indicate the name, address, nationality and residence of the applicant or, if there are several applicants, of each of them." **(Rule 4.5 (a))**

"Where any international application indicates as applicants several persons, it shall be sufficient, for the purpose of identifying that application, to indicate, in any Form or correspondence relating to such application, the name of the applicant first named in the request." **(Section 105)**

See also box IX of the present form.

3 "Names of natural persons shall be indicated by the person's family name and given name(s), the family name being indicated before the given name(s)." **(Rule 4.4 (a))**

"Names of legal entities shall be indicated by their full, official designations." **(Rule 4.4 (b))**

4 "Addresses shall be indicated in such a way as to satisfy the customary requirements for prompt postal delivery at the indicated address and, in any case, shall consist of all the relevant administrative units up to, and including, the house number, if any. Where the national law of the designated State does not require the indication of the house number, failure to indicate such number shall have no effect in that State. It is recommended to indicate any telegraphic and teletype address and telephone number." **(Rule 4.4 (c))**

"For each applicant, inventor, or agent, only one address may be indicated." **(Rule 4.4 (d))**

5 "Where any name or address is written in characters other than those of the Latin alphabet, the same shall also be indicated in characters of the Latin alphabet either as a mere transliteration or through translation into English. The applicant shall decide which words will be merely transliterated and which words will be so translated." **(Rule 4.16 (a))**

"The name of any country written in characters other than those of the Latin alphabet shall also be indicated in English." **(Rule 4.16 (b))**

6 "The applicant's nationality shall be indicated by the name of the State of which he is a national." **(Rule 4.5 (b))**

See Section 201 in Note **10** below.

7 "The applicant's residence shall be indicated by the name of the State of which he is resident." **(Rule 4.5 (c))**

See Section 201 in Note **10** below.

8 Inventor (Articles 4 (1) *(v)* and 22 (1), Rules 4.1 *(a)* *(v)* and 4.6 *(a)*)

"The request shall contain: the name of and other prescribed data concerning the inventor where the national law of at least one of the designated States requires that these indications be furnished at the time of filing a national application... **(Article 4 (1) (v))**

"The applicant shall furnish a copy of the international application (unless the communication provided for in Article 20 has already taken place) and a translation thereof (as prescribed), and pay the national fee (if any), to each designated Office not later than at the expiration of 20 months from the priority date. Where the national law of the designated State requires the indication of the name of and other prescribed data concerning the inventor but allows that these indications be furnished at a time later than that of the filing of a national application, the applicant shall, unless they were contained in the request, furnish the said indications to the national Office of or acting for that State not later than at the expiration of 20 months from the priority date." **(Article 22 (1))**

"If the applicant is the inventor, the request, ...shall contain a statement to that effect or shall repeat the applicant's name in the space reserved for indicating the inventor." **(Rule 4.6 (b))**

See also box X of the present form.

9 Agent or Common Representative (Article 49, Rules 2.2, 4.1 *(a)* (iii), 4.7 and 4.8)

"Any attorney, patent agent, or other person, having the right to practice before the national Office with which the international application was filed, shall be entitled to practice before the International Bureau and the competent International Searching Authority and competent International Preliminary Examining Authority in respect of that application." **(Article 49)**

"Whenever the word "agent" is used, it shall be construed as meaning any person who has the right to practice before international authorities as defined in Article 49 and, unless the contrary clearly follows from the wording or the nature of the provision, or the context in which the word is used, also the common representative referred to in Rule 4.8." **(Rule 2.2)**

"If agents are designated, the request shall so indicate, and shall state their names and addresses." **(Rule 4.7)**

"If there is more than one applicant and the request does not refer to an agent representing all the applicants ("a common agent"), the request shall designate one of the applicants who is entitled to file an international application according to Article 9 as their common representative." **(Rule 4.8 (a))**

"If there is more than one applicant and the request does not refer to an agent representing all the applicants and it does not comply with the requirement of designating one of the applicants as provided in paragraph *(a)*, the applicant first named in the request who is entitled to file an international application according to Article 9 shall be considered the common representative." **(Rule 4.8 (b))**

"Appointment of any agent or of any common representative within the meaning of Rule 4.8 *(a)*, if the said agent or common representative is not designated in the request signed by all applicants, shall be effected in a separate signed power of attorney (i.e., a document appointing an agent or a common representative)." **(Rule 90.3 (a))**

"The power of attorney may be submitted to the receiving Office or the International Bureau. Whichever of the two is the recipient of the power of attorney submitted shall immediately notify the other and the interested International Searching Authority and the interested International Preliminary Examining Authority." **(Rule 90.3 (b))**

"If the separate power of attorney is not signed as provided in paragraph *(a)*, or if the required separate power of attorney is missing, or if the indication of the name or address of the appointed person does not comply with Rule 4.4, the power of attorney shall be considered non-existent unless the defect is corrected." **(Rule 90.3 (c))**

As for indications of names and addresses see Notes **3** and **4**.

"'International Authorities' means the receiving Offices, the International Searching Authorities, the International Preliminary Examining Authorities, and the International Bureau." **(Section 101 (vi))**

"Any correspondence from an International Authority intended for the applicant, or, in the case of several applicants, the applicants, shall be addressed as follows:"

"Where the applicant has designated or appointed one agent, correspondence shall be addressed to that agent. Where, in the case of several applicants, the applicants are represented by a common representative or a common agent, correspondence shall be addressed to that representative or that agent." **(Section 108 (a) (i))**

"Where the applicant has designated several agents in the request, correspondence shall be addressed to the agent first mentioned therein. Where, in the case of several applicants, the applicants have designated several common agents in the request, correspondence shall be addressed to the common agent first mentioned therein." **(Section 108 (a) (ii))**

"Where the applicant has appointed several agents in one or more separate powers of attorney, correspondence shall be addressed to the agent first mentioned in the earliest filed and still valid separate power of attorney. Where, in the case of several applicants, the applicants have appointed several common agents in one or more separate powers of attorney, correspondence shall be addressed to the common agent first mentioned in the earliest filed and still valid separate power of attorney." **(Section 108 (a) (iii))**

"Any correspondence from an International Authority to the applicant or his agent shall be marked with the file reference, composed either of letters or numbers, or both, of the applicant or the agent, if so indicated on the request form, provided this reference does not exceed ten characters **(Section 108 (b))**

"In the case of several applicants, any agent designated under Rule 4.7 in the request signed by all the applicants, or appointed under Rule 90.3 in a separate power of attorney signed by all the applicants, shall be considered a common agent." **(Section 106)**

"If there are several agents appointed by the same applicant or applicants, any act by or in relation to any of the several agents shall have the effect of an act by or in relation to the said applicant or applicants." **(Rule 90.2 (c))**

"If the applicants designate a common representative in accordance with Rule 4.8 *(a)*, such common representative shall be indicated on the front page of the request form. The indication of the common representative shall take the form of a statement designating the named applicant to act as the common representative on behalf of all the applicants." **(Section 206)**

10 Designation of States (Rule 4.1 *(a)* (iv))

"Contracting States shall be designated in the request by their names." **(Rule 4.9)**

"The name of any State referred to in the request shall be indicated either by the full name of the State or by a generally accepted short title which, if the indications are in English or French, shall be as appears in *Annex A*. The receiving Office, or the International Bureau where the receiving Office fails to do so, shall insert, in the appropriate space provided for in the request form, the two-letter country code as appears in *Annex B* (for example, where France is the third designated State in Box V of the request form, "FR 3. France" or "FR 3. French Republic")." **(Section 201 (a))**

"The receiving Office shall cancel *ex-officio* the designation of States other than Contracting States, and inform the applicant promptly of such action." **(Section 201 (b))**

"If the applicant specifies the States to which he wishes any amount paid to be applied as designation fee, the amount shall be applied

accordingly to the number of States which are covered by the amount in the order specified by the applicant." **(Rule 15.5 (a))**

"If the applicant does not specify any such wish and if the amount or amounts received by the receiving Office are higher than the basic fee and one designation fee but lower than what is due according to the number of the designated States, any amount in excess of the basic fee and one designation fee shall be treated as designation fees for the States following the State first named in the request and in the order in which the States are designated in the request up to and including that designated State for which the total amount of the designation fee is covered by the amount or amounts received." **(Rule 15.5 (b))**

"The designation fee for the first mentioned State belonging to a group of States for which the same regional patent is sought and which is specified under paragraph *(a)* or which is reached under paragraph *(b)* shall, for the purposes of the said paragraphs, be considered as covering also the other States of the said group." **(Rule 15.5 (c))**

11 "The request shall, where applicable, contain: ...(iv) an indication that the applicant wishes to obtain a regional patent and the names of the designated States for which he wishes to obtain such a patent." **(Rule 4.1 (b) (iv))**

"Where the applicant wishes to obtain a regional patent in respect of any designated State, he shall make the indication in the request referred to in Rule 4.1 *(b)* (iv) by inserting the words "regional patent", or their equivalent in the language of the international application, immediately after the indication of the said State or, where an indication has been made under Section 202, after that indication, provided that:

(i) where Article 4 (1) (ii), third clause applies, and not all the States party to the regional treaty have been designated, the international application shall be treated as if all those States had been designated and as if the designations of all such States contained the said words, whether the said designations contained an indication of the wish to obtain a regional patent or, according to Article 4 (1) (ii), fourth clause, are to be treated as containing such indication;

(ii) where the national law of any designated State contains a provision as referred to in Article 45 (2), the International Bureau shall, according to Article 4 (1) (ii), fourth clause, treat the designation as if it contained the said words even where the applicant failed to indicate them." **(Section 203)**

12 "In respect of any designated or elected State whose law provides for the grant of inventors' certificates, utility certificates, utility models, patents or certificates of addition, inventors' certificates of addition, or utility certificates of addition, the applicant may indicate, as prescribed in the Regulations, that his international application is for the grant, as far as that State is concerned, of an inventor's certificate, a utility certificate, or a utility model, rather than a patent, or that it is for the grant of a patent or certificate of addition, an inventor's certificate of addition, or a utility certificate of addition, and the ensuing effect shall be governed by the applicant's choice. For the purposes of this Article and any Rule thereunder, Article 2 (ii) shall not apply." **(Article 43)**

"If the applicant wishes his international application to be treated, in any designated State, as an application not for a patent but for the grant of any of the other kinds of protection specified in Article 43, he shall so indicate in the request. For the purposes of this paragraph, Article 2 (ii) shall not apply." **(Rule 4.12 (a))**

"Where the applicant wishes his application to be treated in any designated State as an application not for a patent but for the grant of another kind of protection referred to in Article 43, he shall make the indication in the request referred to in Rule 4.12 *(a)* by inserting the words "inventor's certificate", "utility certificate", "utility model", "patent of addition", "certificate of addition", "inventor's certificate of addition" or "utility certificate of addition", or their equivalent in the language of the international application, immediately after the indication of the said State." **(Section 202 (a))**

"In respect of any designated or elected State whose law permits an application, while being for the grant of a patent or one of the other kinds of protection referred to in Article 43, to be also for the grant of another of the said kinds of protection, the applicant may indicate, as prescribed in the Regulations, the two kinds of protection he is seeking, and the ensuing effect shall be governed by the applicant's indications. For the purposes of this Article, Article 2 (ii) shall not apply." **(Article 44)**

"Where the applicant is seeking two kinds of protection under Article 44, he shall make the indication in the request referred to in Rule 4.12 *(b)* by inserting, immediately after the indication of the said State and in the language of the international application, either

(i) any two of the following terms connected by the word "and": "patent", "inventor's certificate", "utility certificate", "utility model", "patent of addition", "certificate of addition", "inventor's certificate of addition", "utility certificate of addition"; or

(ii) any two of the terms indicated in (i), above, one of them preceded by the word "primarily" and the other by the word "subsidiarily"." **(Section 202 (b))**

13 Priority Claim (Rules 4.1 *(b)* (i) and 4.10)

14 "Any date in the international application, or used in any correspondence emanating from International Authorities relating to the international application, shall be indicated by the Arabic number of the day, by the name of the month, and by the Arabic number of the year. The receiving Office, where the applicant has not done so, or the International Bureau, where the applicant has not done so and the receiving Office fails to do so, shall, after or below any date indicated by the applicant in the request, repeat the date, in parenthesis, by indicating it by two-digit Arabic numerals each for the number of the day, for the number of the month and for the last two numbers of the year, in that order and with a period after the digit pairs of the day and of the month (for example, "30 March 1978 (30.03.78)")." **(Section 110)**

15 "If the application number of the earlier application is not indicated in the request but is furnished by the applicant to the International Bureau prior to the expiration of the 16th month from the priority date, it shall be considered by all designated States to have been furnished in time. If it is furnished after the expiration of that time limit, the International Bureau shall inform the applicant and the designated Offices of the date on which the said number was furnished to it. ..." **(Rule 4.10 (c))**

16 Parent Application or Grant (Rule 4.1 *(b)* (v))

"If the applicant wishes his international application to be treated, in any designated State, as an application for a patent or certificate of addition, inventor's certificate of addition, or utility certificate of addition, he shall identify the parent application or the parent patent, parent inventor's certificate, or parent utility certificate to which the patent or certificate of addition, inventor's certificate of addition, or utility certificate of addition, if granted, relates. For the purposes of this paragraph, Article 2 (ii) shall not apply." **(Rule 4.13)**

"If the applicant wishes his international application to be treated, in any designated State, as an application for a continuation or a continuation-in-part of an earlier application, he shall so indicate in the request and shall identify the parent application involved." **(Rule 4.14)**

17 Earlier International or International-Type Search (Rule 4.1 *(b)* (ii))

"If an international or international-type search has been requested on an application under Article 15 (5), the request may state that fact and identify the application (or its translation, as the case may be) by country, date and number, and the request for the said search by date and, if available, number." **(Rule 4.11)**

18 Different Applicants for Different (Groups of) Designated States (Rule 18.4)

"The international application may indicate different applicants for the purposes of different designated States, provided that, in respect of each designated State, at least one of the applicants indicated for the purposes of that State is entitled to file an international application according to Article 9." **(Rule 18.4 (a))**

19 Different Inventors for Different (Groups of) Designated States

"The request may, for different designated States, indicate different persons as inventors where, in this respect, the requirements of the national laws of the designated States are not the same. In such a case, the request shall contain a separate statement for each designated State or group of States in which a particular person, or the same person, is to be considered the inventor, or in which particular persons, or the same persons, are to be considered the inventors." **(Rule 4.6 (c))**

20 Signature

The signature **(Rule 4.1 (d))** must be that of the applicant and if there are several applicants all must sign **(Rule 4.15)**; however, the signature may be that of the agent **(Rule 2.1)** where there is attached to this request a separate power of attorney appointing the agent. "Appointment of any agent or of any common representative within the meaning of Rule 4.8 *(a)*, if the said agent or common representative is not designated in the request signed by all applicants, shall be effected in a separate signed power of attorney (i.e., a document appointing an agent or a common representative)." **(Rule 90.3 (a))**

21 Check List

"*(a)* The printed form shall contain a list which, when filled in, will show:

(i) the total number of sheets constituting the international application and the number of the sheets of each element of the international application (request, description, claims, drawings, abstract);

(ii) whether or not the international application as filed is accompanied by a power of attorney (i.e., a document appointing an agent or a common representative), a priority document, a receipt for the fees paid or a check for the payment of the fees, an international or an international-type search report, a document in evidence of the fact that the applicant is the successor in title of the inventor, and any other document (to be specified in the check list);

(iii) the number of that figure of the drawings which the applicant suggests should accompany the abstract when the abstract is published on the front page of the pamphlet and in the Gazette; in exceptional cases, the applicant may suggest more than one figure.

(b) The list shall be filled in by the applicant, failing which the receiving Office shall fill it in and make the necessary annotations, except that the number referred to in paragraph *(a)* (iii) shall not be filled in by the receiving Office." **(Rule 3.3)**

22 Missing Drawings (Rule 26.6)

"*(a)* If, as provided in Article 14(2), the international application refers to drawings which in fact are not included in that application, the receiving Office shall so indicate in the said application." **(Rule 26.6 (a))**

"Where the international application refers to drawings which in fact are not included in that application, the receiving Office shall make the indication referred to in Rule 26.6 *(a)* by an appropriate marking of the request form." **(Section 310 (a))**

THIS SHEET DOES NOT COUNT AS A PAGE OF THE INTERNATIONAL APPLICATION

APPLICANT		DOCKET NUMBER	This column for use by receiving Office
RO/US RECEIPT DATE	INTERNATIONAL APPLICATION NUMBER	SUBMISSION DATE	

UNITED STATES RECEIVING OFFICE FEE CALCULATION SHEET[1]

FEES SUBMITTED OR AUTHORIZED:

I. TRANSMITTAL FEE[2] ..... ① T

II. SEARCH FEE[3] ..... ② S

III. INTERNATIONAL FEE[4]

BASIC FEE[5]

Indicate the number of SHEETS contained in the international application _____.

first 30 sheets ..... ③ b_1

remaining _____ sheets x④ $ _____ = b_2

Add amounts entered in boxes b_1 and b_2 and enter total in box B.
This figure is the amount of the BASIC FEE ..... B

DESIGNATION FEES[6]

Indicate the number of DESIGNATED STATES for which regional patents have not been sought _____ x⑤ $ _____ = d_1

Indicate the number of GROUPS of designated States for which regional patents have been sought _____ x⑤ $ _____ = d_2

—Note designation fee instructions below—

Add amounts entered in boxes d_1 and d_2 and enter total in box D.
This figure is the amount of the DESIGNATION FEES ..... D

Add amounts entered in boxes B and D, and enter total in box I.
This figure is the amount of the INTERNATIONAL FEE I

IV. TOTAL FEES SUBMITTED OR AUTHORIZED:

Add amounts entered in boxes T, S and I, and enter total in the total box. This figure is the total amount of the FEES SUBMITTED or AUTHORIZED ..... TOTAL

Payment must be made in United States currency. Checks, postal money orders or bank drafts must be made payable to the Commissioner of Patents and Trademarks. Payment may also be made by authorization to charge to a Patent and Trademark Office deposit account. ①–⑥: FEE AMOUNTS LISTED ON REVERSE SIDE.

DEPOSIT ACCOUNT AUTHORIZATION[7]

☐ The RO/US is hereby authorized to charge the total fees indicated above to my deposit account.

☐ The RO/US is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.

Deposit Account Number _____ *Date* _____ *Signature* _____

INSTRUCTIONS REGARDING DESIGNATION FEES: *(See reverse side for list of member States)*

Use the space below to indicate, in order, those countries for which the designation fees submitted or authorized are to be applied. Include after the name of the country any indication that a regional patent is sought. If no countries are indicated below, the RO/US will apply the designation fees submitted or authorized to the designated countries in the order in which those countries are listed in the Request.

NOTES TO FORM PCT/RO/101 (ANNEX) (U.S. VERSION)

1 The purpose of the fee calculation sheet is to aid the applicant in calculating fees that are submitted to the receiving Office for the processing of the international application. It is strongly recommended that the applicant complete the form and submit it to the receiving Office both upon filing and with any later submission of designation fees. This will help the receiving Office to verify the calculations.

2 "Any receiving Office may require that the applicant pay a fee to it, for its own benefit, for receiving the international application, transmitting copies to the International Bureau and the competent International Searching Authority, and performing all the other tasks which it must perform in connection with the international application in its capacity of receiving Office ("transmittal fee")." (PCT Rule 14.1(a))

"The amount and the due date of the transmittal fee, if any, shall be fixed by the receiving Office." (PCT Rule 14.1(b))

THE TRANSMITTAL FEE MUST BE PAID IN FULL UPON FILING. (35 U.S.C. 361(d))

3 "Each International Searching Authority may require that the applicant pay a fee ("search fee") for its own benefit for carrying out the international search and for performing all other tasks entrusted to International Searching Authorities by the Treaty and these Regulations." (PCT Rule 16.1 (a))

"The search fee shall be collected by the receiving Office. It shall be payable in the currency prescribed by that Office, it being understood that, if that currency is not the same as the currency of the State in which the International Searching Authority is located, the search fee, when transferred by the receiving Office to that Authority, shall be freely convertible into the currency of the said State. As to the time of payment of the search fee, Rule 15.4(a) shall apply." (PCT Rule 16.1 (b))

THE SEARCH FEE MUST BE PAID IN FULL ON FILING. (35 U.S.C. 361(d))

4 "Each international application shall be subject to the payment of a fee for the benefit of the International Bureau ("international fee") consisting of:

(i) a "basic fee," and

(ii) as many "designation fees" as there are States designated in the international application, provided that, where a regional patent is sought for certain designated States, only one designation fee shall be due for those States." (PCT Rule 15.1)

5 "The amount of the basic fee shall be:

(i) if the international application contains not more than 30 sheets: US $165.00 or 300 Swiss francs,

(ii) if the international application contains more than 30 sheets: US $165.00 or 300 Swiss francs plus US $3.00 or 6 Swiss francs per sheet in excess of 30 sheets." (PCT Rule 15.2(a))

THE BASIC FEE MUST BE PAID IN FULL UPON FILING IN UNITED STATES CURRENCY. (35 U.S.C. 361(d), 376 (a))

6 "The amount of the designation fee shall be for each designated state or each group of designated States for which the same regional patent is sought: US $40.00 or 80 Swiss francs. (PCT Rule 15.2(b))

THE DESIGNATION FEES MAY BE PAID ON FILING, BUT MUST BE PAID NO LATER THAN ONE YEAR FROM THE PRIORITY DATE. THOSE DESIGNATIONS FOR WHICH FULL PAYMENT IS NOT RECEIVED BY ONE YEAR FROM THE PRIORITY DATE WILL BE CONSIDERED WITHDRAWN. (PCT Rule 15.4(b))

THE DESIGNATION FEE MUST BE PAID IN UNITED STATES CURRENCY. (35 U.S.C. 376(a))

7 The RO/US will not charge fees to a deposit account unless an authorization, including signature and account number, is provided.

FEE AMOUNTS (as of 01 June 1978)

(1)	Transmittal Fee	$ 35.00
(2)	Search Fee	300.00
(3)	Basic Fee First 30 sheets	165.00
(4)	Basic Fee Each sheet over 30	3.00
(5)	Designation Fee Each State or group of States for which the same regional patent is sought	40.00

Caution: The above fees are subject to change. Consult the OFFICIAL GAZETTE of the United States Patent and Trademark Office for the current fee amounts.

PCT MEMBER STATES WHICH MAY BE DESIGNATED (as of 01 June 1978)

Code	Short Official Title
BR	Brazil
CM	Cameroon*
CF	Central African Empire*
TD	Chad*
CG	Congo*
FR	France**
GA	Gabon*
DE	Germany, Federal Republic of**
LU	Luxembourg**
MG	Madagascar
MW	Malawi
SN	Senegal*
SU	Soviet Union
SE	Sweden**
CH	Switzerland**
TG	Togo*
GB	United Kingdom **
US	United States of America

*Members of OAPI Regional Patent System

** Members of EPC Regional Patent System

Caution: The above Member States may limit the type of national or regional patent protection available through PCT. Consult the OFFICIAL GAZETTE of the United States Patent and Trademark Office for further information. The GAZETTE will also list additional Member States as they ratify PCT.

PATENT COOPERATION TREATY
INTERNATIONAL SEARCH REPORT

IDENTIFICATION OF INTERNATIONAL APPLICATION	Applicant's or Agent's File Reference [19]
International Application No. [1]	International Filing Date [1]
Receiving Office [1]	Priority Date Claimed [3]
Applicant [1]	

I. ☐ **CERTAIN CLAIMS WERE FOUND UNSEARCHABLE** [10] (Observations on supplemental sheet (2))

II. ☐ **UNITY OF INVENTION IS LACKING** [11] (Observations on supplemental sheet (2))

III. TITLE, ABSTRACT AND FIGURE OF DRAWING

1. The following indicated items are approved as submitted by the applicant: [6]
   ☐ Title. ☐ Abstract.
2. The texts established by this International Searching Authority of the following indicated items are set forth below:
   ☐ Title.
   ☐ Abstract.

☐ Text of the abstract continued on supplemental sheet (1)

3. ☐ This report is incomplete as far as the abstract is concerned as the time limit for comments by the applicant on the draft prepared by this International Searching Authority has not expired. [7]

4. The figure of the drawings indicated below is to be published with the abstract:
   ☐ Figure No._____as suggested by the applicant. [8]
   Figure No _____because:
   ☐ applicant failed to suggest a figure. [9]
   ☐ this figure better characterizes the invention. [9]

Form PCT/ISA/210 (first sheet) (October 1977) See notes on accompanying sheet

International Application No

FURTHER INFORMATION CONTINUED FROM THE FIRST SHEET
(Not for publication)

See notes on accompanying sheet

INTERNATIONAL SEARCH REPORT

International Application No

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]

* Special categories of cited documents: [15]

"A" document defining the general state of the art

"E" earlier document but published on or after the international filing date

"L" document cited for special reason other than those referred to in the other categories

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but on or after the priority date claimed

"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention

"X" document of particular relevance

IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [2]
International Searching Authority [1]	**Signature of Authorized Officer** [20]

Form PCT/ISA/210 (second sheet) (October 1977)

See notes on accompanying sheet

International Application No.

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [10]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers....., because they relate to subject matter [12] not required to be searched by this Authority, namely:

2. ☐ Claim numbers....., because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out [13], specifically:

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [11]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

NOTES TO FORM PCT/ISA/210

These Notes are intended to facilitate the use of the present form. For full information, see the text of the Patent Cooperation Treaty and the texts of the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and the said texts, the latter are applicable. "Article" refers to Articles of the Treaty, "Rule" refers to Rules of the Regulations and "Section" refers to Sections of the Administrative Instructions.

1 "The international search report shall identify the International Searching Authority which established it by indicating the name of such Authority, and the international application by indicating the international application number, the name of the applicant, the name of the receiving Office, and the international filing date." **(Rule 43.1)**

2 "The international search report shall be dated and shall indicate the date on which the international search was actually completed. It shall also indicate the filing date of any earlier application whose priority is claimed." **(Rule 43.2)**

3 "The international search report shall contain the classification of the subject matter at least according to the International Patent Classification." **(Rule 43.3 (a))**
"Such classification shall be effected by the International Searching Authority." **(Rule 43.3 (b))**
"Where the subject matter of the international application is such that classification thereof requires more than one classification symbol according to the principles to be followed in the application of the International Patent Classification to any given patent document, the international search report shall indicate all such symbols." **(Section 504 (a))**
"Where any national classification system is used, the international search report may indicate all the applicable classification symbols also according to that system." **(Section 504 (b))**
"Where the subject matter of the international application is classified both according to the International Patent Classification and to any national classification system, the international search report shall, wherever possible, indicate the corresponding symbols of both classifications opposite each other." **(Section 504 (c))**

4 "The international search report shall list the classification identification of the fields searched. If that identification is effected on the basis of a classification other than the International Patent Classification, the International Searching Authority shall publish the classification used." **(Rule 43.6 (a))**

5 "If the international search extended to patents, inventors' certificates, utility certificates, utility models, patents or certificates of addition, inventors' certificates of addition, utility certificates of addition, or published applications for any of those kinds of protection, of States, periods, or languages, not included in the minimum documentation as defined in Rule 34, the international search report shall, when practicable, identify the kinds of documents, the States, the periods, and the languages to which it extended. For the purposes of this paragraph, Article 2 (ii) shall not apply." **(Rule 43.6 (b))**

6 "Subject to paragraphs *(b)* and *(c)*, the international search report shall either state that the International Searching Authority approves the title and the abstract as submitted by the applicant or be accompanied by the text of the title and/or abstract as established by the International Searching Authority under Rules 37 and 38." **(Rule 44.2 (a))**

7 "If, at the time the international search is completed, the time limit allowed for the applicant to comment on any suggestion of the International Searching Authority in respect of the abstract has not expired, the international search report shall indicate that it is incomplete as far as the abstract is concerned". **(Rule 44.2 (b))**

8 The figure(s) suggested by the applicant is indicated in the check list of the request; see **Rule 3.3 (a) (iii)**.

9 "If the applicant fails to make the indication referred to in Rule 3.3 *(a)* (iii), or if the International Searching Authority finds that a figure or figures other than that figure or those figures suggested by the applicant would among all the figures of all the drawings, better characterize the invention, it shall indicate the figure or figures which it so considers. Publications by the International Bureau shall then use the figure or figures so indicated by the International Searching Authority. Otherwise, the figure or figures suggested by the applicant shall be used in the said publications." **(Rule 8.2)**

10 This part of the report is filled in only where Article 17 (2) *(b)* applies. (Where certain claims were not searched because of lack of unity of invention and non-payment of additional fees, part V—rather than this part—is filled in.) **Article 17 (2)** reads as follows:

"*(a)* If the International Searching Authority considers

(i) that the international application relates to a subject matter which the International Searching Authority is not required, under the Regulations, to search, and in the particular case decides not to search, or

(ii) that the description, the claims, or the drawings, fail to comply with the prescribed requirements to such an extent that a meaningful search could not be carried out,

the said Authority shall so declare and shall notify the applicant and he International Bureau that no international search report will be established.

"*(b)* If any of the situations referred to in subparagraph *(a)* is found to exist in connection with certain claims only, the international search report shall so indicate in respect of such claims, whereas, for the other claims, the said report shall be established as provided in Article 18."

11 This part of the report is filled in only where, in the course of the procedure preceding the issuance of this report the International Searching Authority, having found that the international application does not comply with the requirement of unity of invention, invites the applicant to pay additional fees. See **Article 17 (3) (a)** reading as follows:

"If the International Searching Authority considers that the international application does not comply with the requirement of unity of invention as set forth in the Regulations, it shall invite the applicant to pay additional fees. The International Searching Authority shall establish the international search report on those parts of the international application which relate to the invention first mentioned in the claims ("main invention") and, provided the required additional fees have been paid within the prescribed time limit, on those parts of the international application which relate to inventions in respect of which the said fees were paid."
"If the applicant paid additional fees for the international search, the international search report shall so indicate. Furthermore, where the international search was made on the main invention only (Article 17 (3) *(a)*), the international search report shall indicate what parts of the international application were and what parts were not searched." **(Rule 43.7)**

12 See **Article 17 (2) (a) (i)**, quoted in note **10**, above, and **Rule 39** reading as follows:

"No International Searching Authority shall be required to search an international application if, and to the extent to which, its subject matter is any of the following:

(i) scientific and mathematical theories,

(ii) plant or animal varieties or essentially biological processes for the production of plants and animals, other than microbiological processes and the products of such processes,

(iii) schemes, rules or methods of doing business, performing purely mental acts or playing games,

(iv) methods for treatment of the human or animal body by surgery or therapy, as well as diagnostic methods,

(v) mere presentations of information,

(vi) computer programs to the extent that the International Searching Authority is not equipped to search prior art concerning such programs."

13 See **Article 17 (2) (a) (ii)**, quoted in note **10**, above.

14 "The objective of the international search is to discover relevant prior art." **(Article 15 (2))**
Rule 33.1, entitled "Relevant Prior Art for the International Search," reads as follows:

"*(a)* For the purposes of Article 15 (2), relevant prior art shall consist of everything which has been made available to the public anywhere in the world by means of written disclosure (including drawings and other illustrations) and which is capable of being of assistance in determining that the claimed invention is or is not new and that it does or does not involve an inventive step (i.e., that it is or is not obvious), provided that the making available to the public occurred prior to the international filing date.
"*(b)* When any written disclosure refers to an oral disclosure, use, exhibition, or other means whereby the contents of the written disclosure were made available to the public, and such making available to the public occurred on a date prior to the international filing date, the international search report shall separately mention that fact and the date on which it occurred if the making available to the public of the written disclosure occurred on a date posterior to the international filing date.
"*(c)* Any published application or any patent whose publication date is later but whose filing date, or, where applicable, claimed priority date, is earlier than the international filing date of the international application searched, and which would constitute relevant prior art for the purposes of Article 15 (2) had it been published prior to the international filing date, shall be specially mentioned in the international search report."

15 "Where any document cited in the international search report is of particular relevance, the special indication required by Rule 43.5 *(c)* shall consist of the letter "X" placed next to the citation of the said document." **(Section 505)**
"Where any document cited in the international search report refers to an oral disclosure, use, exhibition, or other means referred to in Rule 33.1 *(b)*, the separate indication required by that Rule shall

consist of the letter "O" placed next to the citation of the said document." (Section 507 (a))

"Where any document cited in the international search report is a published application or patent as defined in Rule 33.1 *(c)*, the special mention required by that Rule shall consist of the letter "E" placed next to the citation of the said document." (Section 507 (b))

"Where any document cited in the international search report is a document which defines the general state of the art, it shall be indicated by the letter "A" placed next to the citation of the said document." (Section 507 (c))

"Where any document cited in the international search report is a document whose publication date occurred earlier than the international filing date of the international application, but later than the priority date claimed in that application, it shall be indicated by the letter "P" next to the citation of the said document." (Section 507 (d))

"Where any document cited in the international search report is a document whose publication date occurred after the filing date or the priority date of the international application and is not in conflict with the said application, but is cited for the principle or theory underlying the invention, which may be useful for a better understanding of the invention, or is cited to show that the reasoning or the facts underlying the invention are incorrect, it shall be indicated by the letter «T» next to the citation of the document." (Section 507 (e))

"Where in the international search report any document is cited for reasons other than those referred to in the preceding paragraphs, such document shall be indicated by the letter «L» next to the citation of the document." (Section 507 (f))

16 "The international search report shall contain the citations of the documents considered to be relevant." (Rule 43.5 (a))

"Identification of any document cited in the international search report referred to in Rule 43.5 *(b)* shall be made by indicating the following elements in the order in which they are listed:

(a) *In the case of any patent document* (patent documents being patents within the meaning of Article 2 (ii) as well as published applications relating thereto):

(i) the Office that issued the document, by the two-letter code as in *Annex B*;

(ii) the kind of document, by the appropriate symbols as in *Annex C*;

(iii) the number of the document as given to it by the Office that issued it; (for Japanese patent documents the indication of the year of the reign of the Emperor must precede the serial number of the patent document);

(iv) the date of publication of the cited patent document as indicated thereon;

(v) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings; and

(vi) the name of the patentee or applicant.

(The following example illustrates the citation of a patent document according to paragraph (a) above:

JA, B, 5014535, published 1975, May 28, see column 4, lines 3 to 27, NCR Corporation.)

(b) *In the case of any book or other separately issued publication*

(i) the name of the author;

(ii) the title (including, where applicable, the number of the edition and/or volume);

(iii) the year of publication (when this coincides with the year of the international application or of the priority claim, the International Searching Authority shall endeavour to determine the month and, if necessary, the day of publication and to indicate these data in the international search report);

(iv) the name of the publisher;

(v) as far as available, the place of publication (where only the location of the publisher appears on the book or other separately issued publication, then that location shall be indicated as the place of publication); and

(vi) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of a book or other separately issued publication according to paragraph (b) above:

H. Walton, 'Microwave Quantum Theory', Volume 2, published 1973, by Sweet and Maxwell (London), see pages 138 to 192, especially pages 146 to 148.)

(c) *In the case of any article published in a periodical or other serial publication:*

(i) the title of the periodical or other serial publication;

(ii) the number of the volume and the date of the issue in which the article appears;

(iii) as far as available, the place of publication (where only the location of the publisher appears in the periodical or other serial publication, then that location shall be indicated as the place of publication);

(iv) the author and the title of the article and the number of the page both on which the article starts and ends; and

(v) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of an article published in a periodical or other serial publication according to paragraph (c) above:

IBM Technical Disclosure Bulletin, Volume 17, no. 5, issued 1974 October (Armonk, New York), J. G. Drop, 'Integrated Circuit Personalization at the Module Level', see pages 1344 to 1345.)

(d) *In the case of abstracts*

(i) the identification of the document containing the abstract in the manner set forth in paragraphs *(a)*, *(b)* and *(c)*, respectively, depending upon whether the abstract is contained in a patent document, in a book or other separately issued publication, or in an article published in a periodical or other serial publication;

(ii) in the case where the abstract is not published together with the full text document which served as its basis, the identification of both abstract and full text document on the basis of whatever bibliographic data may be available in respect thereto."

(The following example illustrates the citation of an abstract according to paragraph *(d)* (ii) above:

Chemical Abstracts, Volume 75, no. 20, issued 1971, November 15 (Colombus, Ohio, U.S.A.), D. I. Shetulov, 'Surface Effects During Metal Fatigue' see page 163, column 1, the abstract no. 120718k, Fiz.-Khim. Mekh. Mater. 1971,7(2), 7-11 (Russ).)" (Section 503)

17 "If only certain passages of the cited document are relevant or particularly relevant, they shall be identified, for example, by indicating the page, the column, or the lines, where the passage appears.» (Rule 43.5 (e))

18 "Citations which are not relevant to all the claims shall be cited in relation to the claim or claims to which they are relevant." (Rule 43.5 (d))

"The claims to which cited documents are relevant shall be indicated by placing in the appropriate column of the international search report:

(i) where the cited document is relevant to one claim, the number of that claim; for example, (2) or (17);

(ii) where the cited document is relevant to two or more claims numbered in consecutive order, the numbers of the first and last claims of the series connected by a hyphen; for example, (1-15) or (2-3);

(iii) where the cited document is relevant to two or more claims that are not numbered in consecutive order, the number of each claim placed in ascending order and separated by a comma or commas; for example, (1,6) or (1,7,10);

(iv) where the cited document is relevant to more than one series of claims under (ii) above, or to claims of both categories (ii) and (iii) above, the series or individual claim numbers and series placed in ascending order using commas to separate the several series, or to separate the numbers of individual claims and each series of claims; for example, (1-6, 9-10, 12-15) or (1, 3-4, 6, 9-11)." (Section 508)

19 "Any correspondence from an International Authority to the applicant or his agent shall be marked with the file reference, composed either of letters or numbers, or both, of the applicant or the agent, if so indicated on the request form, provided this reference does not exceed ten characters." (Section 108 (b))

20 "The international search report shall be signed by an authorized officer of the International Searching Authority." (Rule 43.8)

PATENT COOPERATION TREATY

DEMAND [1]

UNDER ARTICLE 31 OF THE PATENT COOPERATION TREATY:

THE UNDERSIGNED REQUESTS THAT THE INTERNATIONAL APPLICATION SPECIFIED BELOW BE THE SUBJECT OF INTERNATIONAL PRELIMINARY EXAMINATION ACCORDING TO THE PATENT COOPERATION TREATY

I. IDENTIFICATION OF THE INTERNATIONAL APPLICATION [2]

Applicant's or Agent's File Reference [3] (indicated by applicant if desired):

International Application No.	International Filing Date	Receiving Office

Title of Invention

II. APPLICANT [4] Additional applicants are indicated on supplemental sheet ☐

Name

Address (including postal code and country)

Nationality (country)	Residence (country)

Telephone number (if any)	Telegraphic address (if any)	Teleprinter address (if any)

III. AGENT OR COMMON REPRESENTATIVE (IF ANY) [5] Additional agents are indicated on supplemental sheet. ☐

A. ☐ Applicant hereby appoints the following named agent or common representative to act on his behalf for the purposes of international preliminary examination. [5]

B. ☐ Applicant has appointed the following named agent or common representative in an accompanying separate power of attorney. [5]

Name

Address (including postal code and country)

Telephone number (if any)	Telegraphic address (if any)	Teleprinter address (if any)

IV. ELECTION OF STATES [6]

V. SIGNATURE OF APPLICANT [7]

(The following is to be filled in by the International Preliminary Examining Authority.)

1. Actual date of receipt of DEMAND

2. Adjusted date of receipt of DEMAND due to the following: (the later of the two dates being applicable where both are indicated.)

   a. ☐ date of timely receipt of HANDLING FEE

   b. ☐ date of timely receipt of proper CORRECTIONS to the DEMAND

Form PCT/IPEA/401 (March 1978) See notes on accompanying sheet

Page ...

USE THIS SHEET IF ANY OF THE BOXES IS NOT LARGE ENOUGH TO CONTAIN INFORMATION TO BE FURNISHED. INDICATE THE BOXES CONTINUED ON THIS SHEET BY THEIR (ROMAN) NUMERALS AND TITLE (e.g.: "II. APPLICANT (CONTINUED)")

NOTES TO FORM PCT/IPEA/401

These Notes are intended to facilitate the filling in of the present form. For full information, see the text of the Patent Cooperation Treaty and the texts of the Regulations and the Administrative Instructions under that Treaty. In the case of discrepancy between these Notes and the said texts, the latter are applicable. "Article" refers to Articles of the Treaty, "Rule" refers to Rules of the Regulations, and "Section" refers to Sections of the Administrative Instructions.

Demand

1 Rule 53 entitled «The Demand» reads as follows:

"53.1 Form

(a) The demand shall be made on a printed form.

(b) Copies of printed forms shall be furnished free of charge by the receiving Offices to the applicants.

(c) The particulars of the forms shall be prescribed by the Administrative Instructions.

(d) The demand shall be submitted in two identical copies."

"53.2 Contents

(a) The demand shall contain:
(i) a petition,
(ii) indications concerning the applicant and the agent if there is an agent,
(iii) indications concerning the international application to which it relates,
(iv) election of States.

(b) The demand shall be signed."

"53.3 The Petition

The petition shall be to the following effect and shall preferably be worded as follows: "Demand under Article 31 of the Patent Cooperation Treaty: The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty."

"53.4 The Applicant

As to the indications concerning the applicant, Rules 4.4 and 4.16 shall apply, and Rule 4.5 shall apply *mutatis mutandis*."

"53.5 The Agent

If an agent is designated, Rules 4.4, 4.7, and 4.16 shall apply, and Rule 4.8 shall apply *mutatis mutandis*."

"53.6 Identification of the International Application

The international application shall be identified by the name of the receiving Office with which the international application was filed, the name and address of the applicant, the title of the invention, and, where the international filing date and the international application number are known to the applicant, that date and that number."

"53.7 Election of States

The demand shall name, among the designated States, at least one Contracting State bound by Chapter II of the Treaty as elected State."

"53.8 Signature

The demand shall be signed by the applicant."

All information introduced into the DEMAND form should, to whatever extent possible, follow the presentation both as to form and substance, of the same information as it appears in the REQUEST form.

Identification of International Application

2 See Rules 53.2 (a) (iii) and 53.6 quoted in the preceding note.

3 "Any correspondence from an International Authority to the applicant or his agent shall be marked with the file reference, composed either of letters or numbers, or both, of the applicant or the agent, if so indicated on the request form, provided this reference does not exceed ten characters." (Section 108 (b))

Applicant

4 See Rule 53.2 *(a)* (ii) and 53.4 quoted in note 1 above.

"Names of natural persons shall be indicated by the person's family name and given name(s), the family name being indicated before the given name(s)." (Rule 4.4 (a))

"Names of legal entities shall be indicated by their full, official designations." (Rule 4.4 (b))

"Addresses shall be indicated in such a way as to satisfy the customary requirements for prompt postal delivery at the indicated address and, in any case, shall consist of all the relevant administrative units up to, and including, the house number, if any. Where the national law of the designated States does not require the indication of the house number, failure to indicate such number shall have no effect in that State. It is recommended to indicate any telegraphic and teletype address and telephone number." (Rule 4.4 (c))

"For each applicant, inventor, or agent, only one address may be indicated." (Rule 4.4 (d))

"Where any name or address is written in characters other than those of the Latin alphabet, the same shall also be indicated in characters of the Latin alphabet either as a mere transliteration or through translation into English. The applicant shall decide which words will be merely transliterated and which words will be so translated." (Rule 4.16 (a))

"The name of any country written in characters other than those of the Latin alphabet shall also be indicated in English." (Rule 4.16 (b))

"The request shall indicate the name, address, nationality and residence of the applicant or, if there are several applicants, of each of them." (Rule 4.5 (a))

"The applicant's nationality shall be indicated by the name of the State of which he is a national." (Rule 4.5 (b))

"The applicant's residence shall be indicated by the name of the State of which he is a resident." (Rule 4.5 (c))

"The name of any State referred to in the request shall be indicated either by the full name of the State or by a generally accepted short title which, if the indications are in English or French, shall be as appearing in *Annex A*. The receiving Office, or the International Bureau where the receiving Office fails to do so, shall insert, in the appropriate space provided for in the request form, the two-letter country code as appearing in *Annex B* (for example, where France is the third designated State in Box V of the request Form, «FR 3. France» or «FR 3. French Republic»)." (Section 201 (a))

Agent or Common Representative

5 "Any attorney, patent agent, or other person, having the right to practice before the national Office with which the international application was filed, shall be entitled to practice before the International Bureau and the competent International Searching Authority and competent International Preliminary Examining Authority in respect of that application." (Article 49)

"Whenever the word «agent» is used, it shall be construed as meaning any person who has the right to practice before international authorities as defined in Article 49 and, unless the contrary clearly follows from the wording or the nature of the provision, or the context in which the word is used, also the common representative referred to in Rule 4.8." (Rule 2.2)

"If there is more than one applicant and the request does not refer to an agent representing all the applicants ("a common agent"), the request shall designate one of the applicants who is entitled to file an international application according to Article 9 as their common representative." (Rule 4.8 (a))

"If there is more than one applicant and the request does not refer to an agent representing all the applicants and it does not comply with the requirement of designating one of the applicants as provided in paragraph *(a)*, the applicant first named in the request who is entitled to file an international application according to Article 9 shall be considered the common representative." (Rule 4.8 (b))

See Rules 53.2 (a) (ii) and 53.5 quoted in note 1 above. Also see Rules 4.4, 4.8 and 4.16 quoted in notes 4 and 5 above.

"In the case of several applicants, any agent designated under Rule 4.7 in the request signed by all the applicants, or appointed under Rule 90.3 in a separate power of attorney signed by all the applicants, shall be considered a common agent." (Section 106)

"If the applicants designate a common representative in accordance with Rule 4.8 *(a)*, such common representative shall be indicated on the front page of the request form. The indication of the common representative shall take the form of a statement designating the named applicant to act as the common representative on behalf of all the applicants." (Section 206)

"If agents are designated, the request shall so indicate, and shall state their names and addresses." (Rule 4.7)

Election of States

6 See Rules 53.2 (a) (iv) and 53.7 quoted in note 1 above.

Signature

7 See Rules 53.2 (b) and 53.8 quoted in note 1 above.

PATENT COOPERATION TREATY
INTERNATIONAL PRELIMINARY EXAMINATION REPORT

IDENTIFICATION OF THE INTERNATIONAL APPLICATION	Applicant's or Agent's File Reference [3]
International Application No. [1]	International Filing Date [1]
Receiving Office [1]	Priority Date Claimed
Applicant (Name) [1]	

BASIS OF REPORT

1. AMENDMENTS AND/OR CORRECTIONS [2] — The amendments and/or corrections made before this International Preliminary Examining Authority in respect of the claims, the description, and/or drawings in the above-identified international application are annexed to this report.

a. ☐ This report has been established on the basis of the claims as amended on the following date (s). (specify)

b. ☐ This report has been established as if the following noted amendments and/or corrections have not been made, since, for the reasons indicated, they have been considered to go beyond the disclosure as filed. (specify)

2. PRIORITY [4]

a. This report has been established as if no priority has been claimed due to the failure to furnish within the prescribed time limit the requested:

☐ copy of the earlier application whose priority has been claimed.

☐ translation of the earlier application whose priority has been claimed.

b. ☐ This report has been established as if no priority has been claimed due to the fact that the priority claim has been found invalid.

Thus, for the purposes of this report, the international filing date indicated above is considered the relevant date.

3. ☐ UNITY OF INVENTION [5] — See the Supplemental Sheet for further details.

4. ☐ NON-ESTABLISHMENT OF REPORT ON QUESTIONS OF NOVELTY, INVENTIVE STEP OR INDUSTRIAL APPLICABILITY [6,7,8] — See the Supplemental Sheet for further details.

CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all.) [9]

According to International Patent Classification (IPC) or to both National Classification and IPC

BASIS OF REPORT (Continued)

3. **UNITY OF INVENTION** [5] — The international application does not comply with the requirement of unity of invention.

a. In response to an invitation to restrict or pay additional fees the applicant has:

☐ restricted the claims.

☐ paid additional fees.

☐ paid additional fees under protest. Where requested by the applicant, the text of the protest together with the decision taken thereon are annexed to this report.

☐ neither restricted nor paid additional fees.

b. ☐ No invitation has been issued. The opinion of this International Preliminary Examining Authority is that the international application does not comply with the requirement of unity of invention for the following reasons. (specify)

c. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

☐ all parts.

☐ the parts relating to the restricted claims, that is claims Nos. _____ .

☐ the parts relating to the main invention, that is claims Nos. _____ .

4. **NON-ESTABLISHMENT OF REPORT ON QUESTIONS OF NOVELTY, INVENTIVE STEP OR INDUSTRIAL APPLICABILITY** [6]

The questions of whether the claimed invention appears to be novel, to involve an inventive step or to be industrially applicable have not for the reasons indicated been gone into in respect of:

a. ☐ the entire international application

b. ☐ claims Nos. _____

for the following reasons:

☐ Said international application, or said claims Nos. _____ relate to the following subject matter which does not require an international preliminary examination. [7] (specify)

☐ The description, claims, or drawings (indicate particular elements) or said claims Nos. _____ are so unclear that no meaningful opinion could be formed. [8]

☐ The claims, or said claims Nos. _____ are so inadequately supported by the description that no meaningful opinion could be formed. [8]

Form PCT/IPEA/409 (supplemental sheet) (June 1977) See notes on accompanying sheet

Page ...

STATEMENT AS TO CLAIMS MEETING CRITERIA OF NOVELTY (N), INVENTIVE STEP (IS) AND INDUSTRIAL APPLICABILITY (IA) [10] AND CITATIONS [11] AND EXPLANATIONS [12] SUPPORTING SUCH STATEMENT

CLAIM NUMBER	CRITERIA SATISFIED			STATEMENT	CITATIONS AND EXPLANATIONS
	(N)	(IS)	(IA)		

Form PCT/IPEA/409 (continuation sheet) (June 1977) See notes on accompanying sheet

NON-WRITTEN DISCLOSURES [13]

Kind of Non-Written Disclosure	Date of Written Disclosure referring to the Non-Written Disclosure	Date of Non-Written Disclosure

CERTAIN PUBLISHED DOCUMENTS [14]

Application/Patent	Date of Publication	Filing Date	Priority Date (Valid Claim)

CERTAIN DEFECTS IN THE INTERNATIONAL APPLICATION [15]

The following defects in the form or contents of the international application have been noted.

CERTAIN OBSERVATIONS ON THE INTERNATIONAL APPLICATION [16]

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description have been noted.

CERTIFICATION

Date Demand Submitted [17]	Date of Completion of the International Preliminary Examination Report [18]
International Preliminary Examining Authority [1]	Signature of Authorized Officer [19]

Form PCT/IPEA/409 (last sheet) (June 1977) See notes on accompanying sheet

NOTES TO FORM PCT/IPEA/409

These Notes are intended to facilitate the use of the present form. For full information, see the text of the Patent Cooperation Treaty and the texts of the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and the said texts, the latter are applicable. "Article" refers to Articles of the Treaty, "Rule" refers to Rules of the Regulations and "Section" refers to Sections of the Administrative Instructions.

1 "The report shall identify the International Preliminary Examining Authority which established it by indicating the name of such Authority, and the international application, by indicating the international application number, the name of the applicant, the name of the receiving Office, and the international filing date." **(Rule 70.3)**

2 "Any correspondence from an International Authority to the applicant or his agent shall be marked with the file reference, composed either of letters or numbers, or both, of the applicant or the agent, if so indicated on the request form, provided this reference does not exceed ten characters". **(Section 108 (b))**

3 "If the claims have been amended, the report shall issue on the claims as amended." **(Rule 70.2 (a))**

"If the International Preliminary Examining Authority considers that any amendment goes beyond the disclosure in the international application as filed, the report shall be established as if such amendment had not been made, and the report shall so indicate. It shall also indicate the reasons why it considers that the amendment goes beyond the said disclosure." **(Rule 70.2 (c))**

"If, before the International Preliminary Examining Authority, amendments or corrections have been made, this fact shall be indicated in the report." **(Rule 70.11)**

"If the claims, the description, or the drawings, were amended or any part of the international application was corrected before the International Preliminary Examining Authority, each replacement sheet marked as provided in Rule 66.8 *(b)* shall be attached to the report as an annex thereto. Replacement sheets superseded by later replacement sheets shall not be attached. If the amendment is communicated in a letter, a copy of such letter shall also be annexed to the report." **(Rule 70.16)**

4 "If, pursuant to Rule 66.7 *(c)*, the report is established as if the priority had not been claimed, the report shall so indicate." **(Rule 70.2 (b))**

"If the International Preliminary Examining Authority needs a copy of the application whose priority is claimed in the international application, the International Bureau shall, on request, promptly furnish such copy, provided that, where the request is made before the International Bureau has received the priority document under Rule 17.1 *(a)*, the applicant shall furnish such copy to the International Bureau and directly to the International Preliminary Examining Authority." **(Rule 66.7 (a))**

"If the application whose priority is claimed is in a language other than the language or one of the languages of the International Preliminary Examining Authority, the applicant shall furnish, on invitation, a translation in the said language or one of the said languages." **(Rule 66.7 (b))**

"The copy to be furnished by the applicant under paragraph *(a)* and the translation referred to in paragraph *(b)* shall be furnished not later than by the expiration of 2 months from the date of the request or invitation. If they are not furnished within that time limit, the international preliminary examination report shall be established as if the priority had not been claimed." **(Rule 66.7 (c))**

See also **Rule 70.10** in note **14** below.

5 "If the applicant paid additional fees for the international preliminary examination, or if the international application or the international preliminary examination was restricted under Article 34 (3), the report shall so indicate. Furthermore, where the international preliminary examination was carried out on restricted claims (Article 34 (3) *(a)*), or on the main invention only (Article 34 (3) *(c)*), the report shall indicate what parts of the international application were and what parts were not the subject of international preliminary examination." **(Rule 70.13)**

Rule 68 entitled "Lack of Unity of Invention (International Preliminary Examination)" reads as follows:

"68.1 No Invitation to Restrict or Pay

Where the International Preliminary Examining Authority finds that the requirement of unity of invention is not complied with and chooses not to invite the applicant to restrict the claims or to pay additional fees, it shall establish the international preliminary examination report, subject to Article 34 (4) *(b)*, in respect of the entire international application, but shall indicate, in the said report, that, in its opinion, the requirement of unity of invention is not fulfilled and shall specify the reasons for which the international application is not considered as complying with the requirement of unity of invention."

"68.2 Invitation to Restrict or Pay

Where the International Preliminary Examining Authority finds that the requirement of unity of invention is not complied with and chooses to invite the applicant, at his option, to restrict the claims or to pay additional fees, it shall specify at least one possibility of restriction which, in the opinion of the International Preliminary Examining Authority, would be in compliance with the applicable requirement, and shall specify the amount of the additional fees and the reasons for which the international application is not considered as complying with the requirement of unity of invention It shall, at the same time, fix a time limit, with regard to the circumstances of the case, for complying with the invitation; such time limit shall not be shorter than 1 month, and it shall not be longer than 2 months, from the date of the invitation."

"68.3 Additional Fees

(a) The amount of the additional fee due for international preliminary examination under Article 34 (3) *(a)* shall be determined by the competent International Preliminary Examining Authority.

(b) The additional fee due for international preliminary examination under Article 34 (3) *(a)* shall be payable direct to the International Preliminary Examining Authority.

(c) Any applicant may pay the additional fee under protest, that is, accompanied by a reasoned statement to the effect that the international application complies with the requirement of unity of invention or that the amount of the required additional fee is excessive. Such protest shall be examined by a three-member board or other special instance of the International Preliminary Examining Authority, or any competent higher authority, which, to the extent that it finds the protest justified, shall order the total or partial reimbursement to the applicant of the additional fee. On the request of the applicant, the text of both the protest and the decision thereon shall be notified to the elected Offices as an annex to the international preliminary examination report.

(d) The three-member board, special instance or competent higher authority, referred to in paragraph *(c)*, shall not comprise any person who made the decision which is the subject of the protest."

"68.4 Procedure in the Case of Insufficient Restriction of the Claims

If the applicant restricts the claims but not sufficiently to comply with the requirement of unity of invention, the International Preliminary Examining Authority shall proceed as provided in Article 34 (3) *(c)*."

"68.5 Main Invention

In case of doubt which invention is the main invention for the purposes of Article 34 (3) *(c)*, the invention first mentioned in the claims shall be considered the main invention."

6 "If the International Preliminary Examining Authority considers

(i) that the international application relates to a subject matter on which the International Preliminary Examining Authority is not required, under the Regulations, to carry out an international preliminary examination, and in the particular case decides not to carry out such examination, or

(ii) that the description, the claims, or the drawings, are so unclear, or the claims are so inadequately supported by the description, that no meaningful opinion can be formed on the novelty, inventive step (non-obviousness), or industrial applicability, of the claimed invention,

the said Authority shall not go into the questions referred to in Article 33 (1) and shall inform the applicant of this opinion and the reasons therefor." **(Article 34 (4) (a))**

"If any of the situations referred to in subparagraph *(a)* is found to exist in, or in connection with, certain claims only, the provisions of that subparagraph shall apply only to the said claims." **(Article 34 (4) (b))**

"If, at the time of establishing the international preliminary examination report, the International Preliminary Examining Authority considers that any of the situations referred to in Article 34 (4) *(a)* exists, that report shall state this opinion and the reasons therefor..." **(Article 35 (3) (a))**

"If a situation under Article 34 (4) *(b)* is found to exist, the international preliminary examination report shall, in relation to the claims in question, contain the statement as provided in subparagraph *(a)*, ..." **(Article 35 (3) (b))**

7 See **Article 34 (4) (a) (i)** and **34 (4) (b)** in the preceding note and **Rule 67** entitled "Subject Matter under Article 34 (4) *(a)* (i)" which reads as follows:

"67.1 Definition

No International Preliminary Examining Authority shall be required to carry out an international preliminary examination on an international application if, and to the extent to which, its subject matter is any of the following:

(i) scientific and mathematical theories,

(ii) plant or animal varieties or essentially biological processes for the production of plants and animals, other than microbiological processes and the products of such processes,

(iii) schemes, rules or methods of doing business, performing purely mental acts or playing games,

(iv) methods for treatment of the human or animal body by surgery or therapy, as well as diagnostic methods,

(v) mere presentations of information,

(vi) computer programs to the extent that the International Preliminary Examining Authority is not equipped to carry out an international preliminary examination concerning such programs."

8 See **Article 34 (4) (a) (ii)** in note **6** above.

9 "The report shall repeat the classification given under Rule 43.3 [classification of the subject matter in the international search report] if the International Preliminary Examining Authority agrees with such classification." **(Rule 70.5 (a))**

"Otherwise, the International Preliminary Examining Authority shall indicate in the report the classification, at least according to the International Patent Classification, which it considers correct." **(Rule 70.5 (b))**

10 "The international preliminary examination report shall not contain any statement on the question whether the claimed invention is or seems to be patentable or unpatentable according to any national law. It shall state, subject to the provisions of para-

graph (3), in relation to each claim, whether the claim appears to satisfy the criteria of novelty, inventive step (non-obviousness), and industrial applicability, as defined for the purposes of the international preliminary examination in Article 33 (1) to (4). The statement shall be accompanied by the citation of the documents believed to support the stated conclusion with such explanations as the circumstances of the case may require. The statement shall also be accompanied by such other observations as the Regulations provide for." (Article 35 (2))

"The statement referred to in Article 35 (2) shall consist of the words "YES" or "NO," or their equivalent in the language of the report, or some appropriate sign provided for in the Administrative Instructions, and shall be accompanied by the citations, explanations and observations, if any, referred to in the last sentence of Article 35 (2)." (Rule 70.6 (a))

"If any of the three criteria referred to in Article 35 (2) (that is, novelty, inventive step (non-obviousness), industrial applicability) is not satisfied, the statement shall be negative. If, in such a case, any of the criteria, taken separately, is satisfied, the report shall specify the criterion or criteria so satisfied." (Rule 70.6 (b))

11 See Article 35 (2) in the preceding note.

"The report shall cite the documents considered to be relevant for supporting the statements made under Article 35 (2)." (Rule 70.7 (a))

"The provisions of Rule 43.5 *(b)* and *(e)* shall apply also to the report." (Rule 70.7 (b))

"The method of identifying any cited document shall be regulated by the Administrative Instructions." (Rule 43.5 (b))

"If only certain passages of the cited document are relevant or particularly relevant, they shall be identified, for example, by indicating the page, the column, or the lines, where the passage appears." (Rule 43.5 (e))

"Identification of any document cited in the international search report referred to in Rule 43.5 (b) shall be made by indicating the following elements in the order in which they are listed:

(a) *In the case of any patent document* (patent documents being patents within the meaning of Article 2 (ii) as well as published applications relating thereto):
  (i) the Office that issued the document, by the two-letter code as in *Annex B*;
  (ii) the kind of document, by the appropriate symbols as in *Annex C*;
  (iii) the number of the document as given to it by the Office that issued it (for Japanese patent documents the indication of the year of the reign of the Emperor must precede the serial number of the patent document);
  (iv) the date of publication of the cited patent document as indicated thereon;
  (v) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings; and
  (vi) the name of the patentee or applicant.

(The following example illustrates the citation of a patent document according to paragraph (a) above:

JA, B, 5014535, published 1975, May 28, see column 4 lines 3 to 27, NCR Corporation.)

(b) *In the case of any book or other separately issued publication*
  (i) the name of the author;
  (ii) the title (including, where applicable, the number of the edition and/or volume);
  (iii) the year of publication (when this coincides with the year of the international application or of the priority claim, the International Searching Authority shall endeavour to determine the month and, if necessary, the day of publication and to indicate these data in the international search report);
  (iv) the name of the publisher;
  (v) as far as available, the place of publication (where only the location of the publisher appears on the book or other separately issued publication, then that location shall be indicated as the place of publication); and
  (vi) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of a book or other separately issued publication according to paragraph (b) above:

H. Walton, 'Microwave Quantum Theory', Volume 2, published 1973, by Sweet and Maxwell (London), see pages 138 to 192, especially pages 146 to 148.)

(c) *In the case of any article published in a periodical or other serial publication*:
  (i) the title of the periodical or other serial publication;
  (ii) the number of the volume and the date of the issue in which the article appears;
  (iii) as far as available, the place of publication (where only the location of the publisher appears in the periodical or other serial publication, then that location shall be indicated as the place of publication);
  (iv) the author and the title of the article and the number of the page both on which the article starts and ends; and
  (v) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of an article published in a periodical or other serial publication according to paragraph (c) above:

IBM Technical Disclosure Bulletin, Volume 17, no. 5, issued 1974 October (Armonk, New York), J. G. Drop, 'Integrated Circuit Personalization at the Module Level', see pages 1344 to 1345.)

(d) *In the case of abstracts*
  (i) the identification of the document containing the abstract in the manner set forth in paragraphs (a), (b) and (c), respectively, depending upon whether the abstract is contained in a patent document, in a book or other separately issued publication, or in an article published in a periodical or other serial publication;
  (ii) in the case where the abstract is not published together with the full text document which served as its basis, the identification of both abstract and full text document on the basis of whatever bibliographic data may be available in respect thereto."

(The following example illustrates the citation of an abstract according to paragraph (d) (ii) above:

Chemical Abstracts, Volume 75, no. 20, issued 1971, November 15 (Columbus, Ohio, U.S.A.), D. I. Shetulov, 'Surface Effects During Metal Fatigue', see page 163, column 1, the abstract no. 120718k, Fiz.-Khim. Mekh. Mater. 1971, 7 (2), 7-11 (Russ).)" (Section 503)

12 See Article 35 (2) in note 10 above.

"The Administrative Instructions shall contain guidelines for cases in which the explanations referred to in Article 35 (2) should or should not be given and the form of such explanations. Such guidelines shall be based on the following principles:
  (i) explanations shall be given whenever the statement in relation to any claim is negative;
  (ii) explanations shall be given whenever the statement is positive unless the reason for citing any document is easy to imagine on the basis of consultation of the cited document;
  (iii) generally, explanations shall be given if the case provided for in the last sentence of Rule 70.6 *(b)* obtains." (Rule 70.8)

"Explanations under Rule 70.8 shall clearly point out to which of the three criteria referred to in Article 35 (2), taken separately, any cited document is applicable and shall clearly describe, with reference to the cited documents, the reasons supporting the conclusion that any of the said criteria is or is not satisfied." (Section 604)

13 "Any non-written disclosure referred to in the report by virtue of Rule 64.2 shall be mentioned by indicating its kind, the date on which the written disclosure referring to the non-written disclosure was made available to the public, and the date on which the non-written disclosure occurred in public." (Rule 70.9)

"In cases where the making available to the public occurred by means of an oral disclosure, use, exhibition or other non-written means ("non-written disclosure") before the relevant date as defined in Rule 64.1 *(b)* and the date of such non-written disclosure is indicated in a written disclosure which has been made available to the public after the relevant date, the non-written disclosure shall not be considered part of the prior art for the purposes of Article 33 (2) and (3). Nevertheless, the international preliminary examination report shall call attention to such non-written disclosure in the manner provided for in Rule 70.9." (Rule 64.2)

14 "Any published application or any patent referred to in the report by virtue of Rule 64.3 shall be mentioned as such and shall be accompanied by an indication of its date of publication, of its filing date, and its claimed priority date (if any). In respect of the priority date of any such document, the report may indicate that, in the opinion of the International Preliminary Examining Authority, such date has not been validly claimed." (Rule 70.10)

"In cases where any application or any patent which would constitute prior art for the purposes of Article 33 (2) and (3) had it been published prior to the relevant date referred to in Rule 64.1 was published, as such, after the relevant date but was filed earlier than the relevant date or claimed the priority of an earlier application which had been filed prior to the relevant date, such published application or patent shall not be considered part of the prior art for the purposes of Article 33 (2) and (3). Nevertheless, the international preliminary examination report shall call attention to such application or patent in the manner provided for in Rule 70.10." (Rule 64.3)

15 "If the International Preliminary Examining Authority considers that, at the time it prepares the report:
  (i) the international application contains any of the defects referred to in Rule 66.2 *(a)* (iii) [defect in the form or contents of the international application under the Treaty or the Regulations thereunder], it shall include this opinion and the reasons therefor in the report;
  (ii) the international application calls for any of the observations referred to in Rule 66.2 *(a)* (v) [observations on the clarity of the claims, the description, and the drawings or the question whether the claims are fully supported by the description], it may include this opinion in the report and, if it does, it shall also indicate in the report the reasons for such opinion." (Rule 70.12)

16 See Rule 70.12 (ii) in the preceding note.

17 "The report shall indicate:
  (i) the date on which the demand was submitted, and
  (ii) the date of the report; that date shall be the date on which the report is completed." (Rule 70.4)

18 See Rule 70.4 (ii) in the preceding note.

19 "The report shall be signed by an authorized officer of the International Preliminary Examining Authority." (Rule 70.14)

TOPIC III: FEES FOR THE PROCESSING OF INTERNATIONAL APPLICATIONS

The Patent and Trademark Office when acting as a Receiving Office and International Searching Authority will charge certain fees for the processing of International applications. The name of the fee, the amount and the date when the fee is due are listed below. Applicants are cautioned that the fee amounts are subject to change. Any changes in the amount of the fees, and the effective dates of the changed amounts will be listed in the OFFICIAL GAZETTE.

As failure to pay in full upon filing those fees due upon filing will result in the withdrawal of the International application, applicants are strongly urged to consult the OFFICIAL GAZETTE for specific fee amounts before filing.

PCT PROCESSING FEES (AS OF 01 JUNE 1978)

Fee	*Amount*	*Time Due*
Transmittal Fee	$35.00	Upon filing.
Search Fee	300.00	Upon filing.
Supplemental Search Fee	200.00 per invention	Within time limit set in notice to applicant.
International Fee		
(1) Basic Fee		
First 30 sheets of application	$165.00	Upon filing.
Each sheet over 30	3.00	Upon filing.
(2) Designation Fee		
Each State for which a patent is sought, or, each group of States for which the same Regional patent is sought.	40.00	12 months from priority date or, if no priority date, 12 months from the international application filing date.

TOPIC IV: PCT MEMBER STATES WHICH MAY BE DESIGNATED IN INTERNATIONAL APPLICATIONS

Eighteen (18) States have ratified or acceded to the Patent Cooperation Treaty. Any of these eighteen States may be designated in International applications as of June 1978. As additional States ratify or accede, their names and the date from which they may be designated will be printed in the OFFICIAL GAZETTE.

The footnotes to the listing of States indicate those States for which regional patent protection is available and any restrictions on the availability of patent protection using PCT.

Applicants are urged to consult also the "PCT Applicant's Guide" and the "Gazette of International Patent Applications" published by the World Intellectual Property Organization (WIPO) as well as the national laws of the Member States for detailed information regarding the availability of protection other than patents in each member State. For the availability of the above mentioned publications, see Topic V of this Notice.

State	*Ratification or Accession*	*Date of Ratification or Accession*	*Date From Which State May Be Designated*
(1) Central African Empire*	Accession	15 September 1971	01 June 1978
(2) Senegal*	Ratification	08 March 1972	01 June 1978
(3) Madagascar	Ratification	27 March 1972	01 June 1978
(4) Malawi	Accession	16 May 1972	01 June 1978
(5) Cameroon*	Accession	15 March 1973	01 June 1978
(6) Chad*	Accession	12 February 1974	01 June 1978
(7) Togo*	Ratification	28 January 1978	01 June 1978
(8) Gabon*	Accession	06 March 1975	01 June 1978
(9) United States of America	Ratification	26 November 1975	01 June 1978
(10) Germany, Federal Republic of**	Ratification	19 July 1976	01 June 1978
(11) Congo*	Accession	08 August 1977	01 June 1978
(12) Switzerland**	Ratification	14 September 1977	01 June 1978
(13) United Kingdom**	Ratification	24 October 1977	01 June 1978
(14) France**	Ratification	25 November 1977	01 June 1978
(15) Soviet Union	Ratification	29 December 1977	01 June 1978
(16) Brazil	Ratification	09 January 1978	01 June 1978
(17) Luxembourg**	Ratification	31 January 1978	01 June 1978
(18) Sweden**	Ratification	17 February 1978	01 June 1978

* Members of African Intellectual Property Organization (OAPI) regional patent system. Only regional patent protection is available for OAPI member states. A designation of any state is an indication that all OAPI states have been designated. Note: only one designation fee is due regardless of the number of OAPI member states designated.

** Members of European Patent Convention (EPC) regional patent system. Either national patents or European patents for member States are available through PCT, *except for France*, for which only European patents are available if PCT is used. If regional protection is desired for one or more States, the indication "regional patent" must follow the designation of the State or States. Note: only one designation fee is due if the regional patent protection is sought for several States.

TOPIC V: AVAILABILITY OF DOCUMENTS CONCERNING THE PATENT COOPERATION TREATY (PCT)

Documents concerning the filing and processing of International Applications and documents of a general informational nature on PCT are available from two major sources: The Patent and Trademark Office (PTO), and the World Intellectual Property Organization (WIPO). As additional documents are made available notification thereof will appear in the OFFICIAL GAZETTE. The addresses which should be used when ordering documents are:

Patent and Trademark Office (PTO):	Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231
World Intellectual Property Organization (WIPO):	World Intellectual Property Organization CH-1211 Geneva 20, Switzerland

PCT Document	Price	Available From
(1) Patent Cooperation Treaty, including Regulations, 48 pp.	Free	PTO
(2) Patent Cooperation Treaty, including Regulations, 155 pp. (large type).	6 Swiss francs	WIPO
(3) Administrative Instructions, complete with Annex F (forms) 320+ pp.	40 Swiss francs	WIPO
(4) Administrative Instructions, without complete Annex F (forms), 23 pp. (four printed forms included).	4 Swiss francs	WIPO
(5) "PCT Applicant's Guide", including informational Annexes, 150 pp. approx.	Free	WIPO
(6) *Records of Washington Diplomatic Conference on the Patent Cooperation Treaty, 1970,* bound volume, 728 pp.	120 Swiss francs	WIPO
(7) Request forms, including fee calculation sheet, 6 pp. (Note: the Request form is a necessary part of the International application.)	Free	PTO
(8) "Gazette of International Patent Applications."	Fixed by WIPO. Write for particulars.	WIPO

Date: Apr. 25, 1978.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

3,019,384, H. A. Wayne, MOISTURE INDICATING DEVICE, **filed** Dec. 9, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c4574, *Harry A. Wayne, doing business as Wayne Engineering Co.* v. *The Coca-Cola Co., Inc. and Montgomery Ward & Co., Ralston Purina Company and CT Corporation System.*

3,076,713, R. H. Maas, PROCESSING MEAT, **filed** Dec. 8, 1977, D.C., E.D.N.Y. (Brooklyn) Doc. 77–C–2415, *Oscar Mayer & Co. Inc. and Knud Cimonsen Ind. Ltd.* v. *Atlantic Pork & Provisions, Inc.*

3,077,724. Stoddard and Seem, APPARATUS FOR PROCESSING YARNS; **3,091,912,** same, METHOD OF PROCESSING STRETCH YARN AND YARNS PRODUCED THEREBY; **3,472,011,** E.P.R. Scragg, TREATMENT OF ARTIFICIAL YARNS AND THREADS, **filed** Oct. 27, 1977, D.C. Fla. (Tallahassee), Doc. PCA 77–0548, *Lex Tex Ltd., Inc.* v. *Monsanto Textile Company.*

3,077,724, Stoddard and Seem, APPARATUS FOR YARNS; **3,091,912,** same, METHOD OF PROCESSING STRETCH YARN AND YARNS PRODUCED THEREBY, **filed** Sept. 23, 1977, D.C., M.D.N.C. (Greensboro), Doc. C–77–458–G, *Lex Tex Ltd., Inc.* v. *Heberlein, Incorporated.*

3,091,912, Stoddard and Seem, METHOD OF PROCESSING STRETCH YARN AND YARNS PRODUCED THEREBY, **filed** Sept. 30, 1977, D.C.S.C. (Columbia), Doc. C/A 77–1964, *Lex Tex Ltd., Inc.* v. *Mafco Textured Fibers, Inc.*

3,091,912. (See 3,077,724.)

3,163,145, Duhaime and Lasto, SOLDER REMOVING TOOL, **filed** Nov. 29, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–4436–HP, *Air-Vac Engineering Company, Inc.* v *Pat Dooley.*

3,184,355, J. K. Brown, METHOD OF MAKING A PRINTER'S ROLLER, **filed** Dec. 12, 1977, D.C. Del. (Wilmington), Doc. 77–472, *Samuel Bingham Company* v. *Rodel, Inc.*

3,237,438, P. A. Tesson, PIPELINE LAYING APPARATUS, **filed** Oct. 7, 1977, D.C. La. (Shreveport), Doc. 771194, *Santa Fe International, Inc.* v. *Martech International, Inc.*

3,241,271, E. T. Berg, REGLET AND FLASHING THEREFOR, **filed** Dec. 14, 1977, D.C., S.D. Calif. (San Diego), Doc. 77–0792–N, *Edward T. Berg and Superior Concrete Accessories, Inc.* v. *William M. Guenzner and Anise Mae Gruenzner (co-partners), doing business as Poway Glass and Roofing Co. and Flash Lock International, Inc.*

3,242,331, Behringer and Burhoe, PORTABLE LIGHT, **filed** Dec. 23, 1975, D.C., N.D. Ohio (Cleveland), Doc. C75–1153, *Greenbriar Mfg. Co. and Rankin Products, Inc.* v. *New Era Products, Inc. and Gary W. Vest.* Stipulation and order settling case and dismissing action with prejudice, Nov. 22, 1977.

3,292,117, Bryant and Johnston, COAXIAL CONNECTOR WITH MEANS FOR PREVENTING AXIAL AND ROTATIONAL MOVEMENT BETWEEN CONNECTOR COMPONENTS, **filed** Aug. 9, 1977, D.C. Conn. (Hartford), Doc. H77–389, *Omni-Spectra Inc.* v. *Sealectro Corp.*

filed, Aug. 14, 1974, D.C., S.D. W. Va. (Charleston), Doc.

3,322,378. C. T. Thompson, TRIPOD DRILL SUPPORT, CA74–321–CH, *Joy Manufacturing Company* v. *Ingersoll-Rand Company.* Judgment, plaintiff take nothing, action is dismissed on the merits with prejudice, Dec. 6, 1977.

3,338,236, J. J. McLeod, Jr., PADDED CLAVICLE SPLINT, **filed** July 29, 1976, D.C., N.D. Calif. (San Francisco), Doc. C–76–1601 GBH, *John J. McLeod, Jr.* v. *Hosmer-Dorrance, Inc., doing business as Chic Orthopedic.* Judgment, injunction issued against defendants refraining them from using in advertising the words "McLeod or MCLEOD" unless clearly distinguished from plaintiff's products, Nov. 30, 1977.

3,437,149, Cugini and Jeannerett, CABLE FEED THROUGH MEANS AND METHOD FOR WELL HEAD CONSTRUCTIONS, **filed** Sept. 8, 1975, D.C., S.D. Tex. (Houston), Doc. 75–H–1530, *Seaboard Pipe & Equipment Company, Inc. v. FMC Corporation.* Order of dismissal, plaintiff's action alleging infringement of said patent is hereby dismissed with prejudice; defendant's first counterclaim and second counterclaim are hereby dismissed without prejudice, Dec. 20, 1977.

3,465,889. F. L. Young, Jr. LIQUID CLARIFIER WEIR CONSTRUCTION, **filed** Nov. 21, 1977, D.C., N.D. Ohio (Youngstown), Doc. C–77–239–Y, *Sybron Corporation* v. *Molded Fiber Glass Companies, Inc.*

3,472,011. (See 3,077,724.)

3,716,977, H. P. Jackson, GRASS CATCHER ASSEMBLY, **filed** May 19, 1977, D.C., N.D. Ga. (Atlanta), Doc. C77–828A, *McDonough Power Equipment, Inc.* v. *Sears, Roebuck and Co.* Stipulation of dismissal without prejudice, Nov. 14, 1977.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,222,715, Re. S.N. 846,909, Filed Jan. 13, 1978, Cl. 425/32, APPARATUS FOR LOADING GREEN TIRES IN A TIRE PRESS, Edward J. Harris, Owner of Record: *Inventor,* Attorney or Agent: None, Ex. Gp.: 322

3,291,947, Re. S.N. 885,848, Filed Mar. 13, 1978, Cl. 200/148 R, INTERRUPTING STRUCTURES FOR COMPRESSED-GAS CIRCUIT INTERRUPTERS HAVING DOUBLE-BREAK HOLLOW ROTATIVE MOVING CONTACT-ARM ASSEMBLY, Roswell C. Van Sickle, Owner of Record: *Westinghouse Electric Corporation, Pittsburgh, Pa.,* Attorney or Agent: C. L. McHale, et al., Ex. Gp.: 217

3,524,613, Re. S.N. 887,103, Filed Mar. 16, 1978, Cl. 244/142, FLEXIBLE GLIDING WING, James D. Reuter, et al., Owner of Record: *Pioneer Parachute Company, Inc., Manchester, Conn.,* Attorney or Agent: Albert Sperry, et al., Ex. Gp.: 315

3,748,079, Re. S.N. 852,364, Filed Nov. 17, 1977, Cl. 425/466, DOUGH SHEET SPREADER, Edward F. Ruiz,

Owner of Record: *Inventor,* Attorney or Agent: Edward O. Ansell, Ex. Gp.: 322

3,748,874, Re. S.N. 884,265, Filed Mar. 6, 1978, Cl. 66/86, YARN KNITTING MACHINE, Robert C. Blezard, Owner of Record: *Smithfield Fibers, Inc., Providence, R.I.,* Attorney or Agent: Elliot A. Salter, et al., Ex. Gp.: 352

3,871,494, Re. S.N. 889,894, Filed Mar. 24, 1978, Cl. 187/95, LIFT TRUCK MAST, Wilfred H. Kelley, Jr., Owner of Record: *White Farm Equipment Company, Cleveland, Ohio,* Attorney or Agent: Jones T. Hoffmann, et al., Ex. Gp.: 313

3,880,612, Re. S.N. 888,028, Filed Mar. 20, 1978, Cl. 44/51, STABILIZATION OF METAL CARBONYLS, Jarl Olle Borje Ostergren, et al., Owner of Record: *Inventors,* Attorney or Agent: Virgil H. Marsh, et al., Ex. Gp.: 117

3,945,506, Re. S.N. 889,144, Filed Mar. 22, 1978, Cl. 214/1.2, FEED APPARATUS FOR AUTOMATIC LATHE, Philippe Scheurer, Owner of Record: *Inventor,* Attorney or Agent: Davidson C. Miller, et al., Ex. Gp.: 314

3,946,100, Re. S.N. 889,143, Filed Mar. 22, 1978, Cl. 264/210 F, PROCESS FOR THE EXPEDITIOUS FORMATION AND STRUCTURAL MODIFICATION OF POLYESTER FIBERS, Herbert L. Davis, et al., Owner of Record: *Celanese Corp., New York, N.Y.,* Attorney or Agent: Thomas J. Morgan, et al., Ex. Gp.: 147

3,978,531, Re. S.N. 883,353, Filed Mar. 3, 1978, Cl. 5/81 R, LIFTING DEVICE, Bengt Erland Ilon, Owner of Record: *Inventor,* Attorney or Agent: Peter G. Mack, Ex. Gp.: 351

3,989,474, Re. S.N. 868,928, Filed Jan. 12, 1978, Cl. 428/683, AUSTENITIC STAINLESS STEEL, George N. Goller, et al., Owner of Record: *Armco Steel Corporation, Middletown, Ohio,* Attorney or Agent: John W. Melville, et al., Ex. Gp.: 164

4,016,922, Re. S.N. 884,264, Filed Mar. 6, 1978, Cl. 164/45, METHOD AND APPARATUS FOR FEEDING GRANULATED MATERIAL, John H. Simmons, et al., Owner of Record: *Precision Metalsmiths, Inc., Cleveland, Ohio,* Attorney or Agent: James T. Hoffmann, et al., Ex. Gp.: 322

4,035,012, Re. S.N. 863,535, Filed Dec. 22, 1977, Cl. 294/90, DUAL ELEVATORS, William C. Guier, Owner of Record: *Inventor,* Attorney or Agent: Paul H. Johnson, et al., Ex. Gp.: 313

PATENT NOTICES

Certificates of Correction for the Week of May 16, 1978

P.P. 4,149	4,046,212	4,061,826	4,068,874
3,673,089	4,046,475	4,061,852	4,068,895
3,766,470	4,046,627	4,061,918	4,069,018
3,806,701	4,046,628	4,062,085	4,069,131
3,882,435	4,047,923	4,062,172	4,069,158
3,929,681	4,048,233	4,062,358	4,069,222
3,944,716	4,048,236	4,062,413	4,069,321
3,957,979	4,048,921	4,062,470	4,069,331
3,966,715	4,049,012	4,062,548	4,069,374
3,973,274	4,049,503	4,062,632	4,069,411
3,978,323	4,049,600	4,062,686	4,069,417
3,982,283	4,051,027	4,062,970	4,069,418
3,983,133	4,051,092	4,063,002	4,069,511
3,989,883	4,051,110	4,063,683	4,069,626
3,992,198	4,051,254	4,063,840	4,069,635
4,000,329	4,051,626	4,063,930	4,069,767
4,002,569	4,051,655	4,064,006	4,069,805
4,002,959	4,052,433	4,064,114	4,069,967
4,007,016	4,053,104	4,064,162	4,070,012
4,007,381	4,053,369	4,064,183	4,070,046
4,009,591	4,053,450	4,064,420	4,070,258
4,013,575	4,053,938	4,064,483	4,070,268
4,015,445	4,054,300	4,064,536	4,070,302
4,021,212	4,054,307	4,064,636	4,070,306
4,022,254	4,054,923	4,064,666	4,070,333
4,022,518	4,055,075	4,064,727	4,070,448
4,024,294	4,055,383	4,064,757	4,070,605
4,024,515	4,055,414	4,064,918	4,070,755
4,025,719	4,055,636	4,064,955	4,070,810
4,027,132	4,055,679	4,064,962	4,070,869
4,028,607	4,055,943	4,064,993	4,070,870
4,029,108	4,056,657	4,064,995	4,071,083
4,029,756	4,056,872	4,065,317	4,071,248
4,029,807	4,058,146	4,065,579	4,071,370
4,030,946	4,058,466	4,065,764	4,071,420
4,030,955	4,058,546	4,066,098	4,071,486
4,032,784	4,058,833	4,066,116	4,071,594
4,034,359	4,058,849	4,066,192	4,071,652
4,036,035	4,059,659	4,066,241	4,071,780
4,036,549	4,059,857	4,066,403	4,072,112
4,038,416	4,060,074	4,066,782	4,072,205
4,039,328	4,060,427	4,067,092	4,072,213
4,040,004	4,060,714	4,067,746	4,072,437
4,040,277	4,060,758	4,067,766	4,073,024
4,040,965	4,060,960	4,068,033	4,073,045
4,041,222	4,061,044	4,068,336	4,073,289
4,041,791	4,061,076	4,068,343	4,073,864
4,042,860	4,061,284	4,068,468	4,073,947
4,044,677	4,061,386	4,068,639	4,074,235
4,045,637	4,061,472	4,068,728	4,075,468
4,045,681	4,061,499	4,068,739	4,075,594
4,045,775	4,061,507	4,068,835	
4,046,069	4,061,693	4,068,853	

Disclaimers

3,402,046.—*Daan M. Zwick*, Rochester, N.Y. MULTILAYER COLOR PHOTOGRAPHIC ELEMENTS. Patent dated Sept. 17, 1968. Disclaimer filed Sept. 12, 1977, by the assignee, *Eastman Kodak Company*.

Hereby enters this disclaimer to all claims of said patent.

3,915,906.—*Ingo Romey*, Essen, Germany. PROCESSES FOR THE PRODUCTION OF GASKET MATERIAL FROM COAL. Patent dated Oct. 28, 1975. Disclaimer filed Jan. 19, 1978, by the assignee, *Bergwerksverband GmbH*.

Hereby enters this disclaimer to claims 1–13 of said patent.

3,961,261.—*Peter W. Pflasterer*, Oak Ridge, Tenn. CRYSTALLESS SCANNING RADIO RECEIVER. Patent dated June 1, 1976. Disclaimer filed Mar. 17, 1978, by the assignee, *Masco Corporation*.

Hereby enters this disclaimer to claims 1–3 and 17–19 of said patent.

3,987,368.—*Adel Abdel Aziz Ahmed*, Annadale, N.J. EQUALIZATION OF BASE CURRENT FLOW IN TWO INTERCONNECTED TRANSISTOR AMPLIFIERS. Patent dated Oct. 19, 1976. Disclaimer filed Mar. 15, 1978, by the assignee, *RCA Corporation*.

Hereby enters this disclaimer to claims 1, 2, 3, 4, 5, 8, 13 and 16 of said patent.

4,012,385.—*John P. Dirlam*, Gales Ferry, Conn. ANTIBACTERIAL QUINOXALINE 1,4-DIOXIDES. Patent dated Mar. 15, 1977. Disclaimer filed Mar. 20, 1978, by the assignee, *Pfizer Inc.*

Hereby enters this disclaimer to claims 1, 2 and 3 of said patent.

4,033,723.—*Morris Lincoln Givner*, Pierefonds, and *Guenther Schilling*, Westmount, Quebec, Canada. PREGNANCY TEST DEVICE. Patent dated July 5, 1977. Disclaimer filed Mar. 24, 1978, by the assignee, *American Home Products Corporation*.

Hereby enters this disclaimer to all claims of said patent.

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Notice of Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

Copies of the patents cited are available from the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications can be purchased from the National Technical Information Service (NTIS), Springfield, Va. 22161 for $4.00 ($8.00 outside North American Continent). Requests for copies of patent applications must include the patent application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator
National Technical Information Service.

U.S. DEPARTMENT OF THE AIR FORCE

AF/JACP, 1900 Half St. SW.
Washington, D.C. 20324

Patent application 841,776. Ramp Toe Stowage System. Filed Oct. 13, 1977.

Patent application 844,163. Parachute Canopy Deployment Control Apparatus. Filed Oct. 21, 1977.

Patent application 848,622. Degasser and Liquid Seal Reservoir. Filed Nov. 4, 1977.

Patent application 852,112. Parachute Inspection Arch. Filed Nov. 16, 1977.

Patent 4,058,734. Passive Infrared Resolution Target. Filed July 19, 1976. Patented Nov. 15, 1977. Not available NTIS.

U.S. DEPARTMENT OF AGRICULTURE

Research Agreements & Patent Branch, General Services Division, Federal Building, Agricultural Research Service
Hyattsville, Md. 20782

Patent 4,053,004. Helical Head Comminuting Shear. Filed May 12, 1975. Patented Oct. 11, 1977. Not available NTIS.

Patent 4,065,287. Methanol Treated Activated Sludge as an Agricultural Chemical Carrier. Filed June 17, 1976. Patented Dec. 27, 1977. Not available NTIS.

U.S. DEPARTMENT OF COMMERCE

National Technical Information Service
5285 Port Royal Road
Springfield, Va. 22161

Patent application 853,354. Sampling Circuit and Method Therefor. Filed Nov. 21, 1977.

U.S. DEPARTMENT OF TRANSPORTATION

Patent Counsel, 400 7th St. SW.
Washington, D.C. 20590

Patent 4,041,494. Distance Measuring Method and Apparatus. Filed Nov. 10, 1975.. Patented Aug. 9, 1977. Not available NTIS.

Patent 4,057,904. Self-Adjusting String Extensiometer. Filed July 16, 1976. Patented Nov. 15, 1977. Not available NTIS.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

National Institutes of Health, Chief, Patent Branch
Westwood Building
Bethesda, Md. 20014

Patent 4,058,460. Horizontal Flow-Through Coil Planet Centrifuge Without Rotating Seals. Filed Mar. 17, 1977. Patented Nov. 15, 1977. Not available NTIS.

U.S. DEPARTMENT OF THE INTERIOR

Branch of Patents, 18th and C Sts. NW.
Washington, D.C. 20240.

Patent application 822,868. HF Coastal Current Mapping Radar System. Filed Aug. 8, 1977.

Patent application 829,128. Castable Calcium Aluminate Refractory. Filed Aug. 30, 1977.

Patent application 830,517. Recovery of Copper and Nickel from Alloys. Filed Sept. 6, 1977.

Patent application 831,640. Page Phone System Analyzer. Filed Sept. 9, 1977.

Patent 4,046,431. Water Lubricated Bearing Assembly for Mining Machine. Filed Sept. 10, 1975. Patented Sept. 6, 1977. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Assistant General Counsel for Patent Matters—NASA
Code GP–2, Washington, D.C. 20546

Patent application 672,636. Plasma Igniter for Internal Combustion Engine. Filed Apr. 1, 1976.

Patent application 848,794. Machine for Forming a Solar Array Strip. Filed Nov. 4, 1977.

Patent application 853,677. Thermal Control Canister. Filed Nov. 21, 1977.

Patent application 854,920. Fire Protection Covering for Small Diameter Missiles. Filed Nov. 25, 1977.

Patent application 856,465. An Improved Solar Concentrator. Filed Nov. 30, 1977.

Patent application 856,466. High Resolution Threshold Photoelectron Spectroscopy by Electron Attachment. Filed Nov. 30, 1977.

Patent 4,053,229. The 2 Deg/90 Deg Laboratory Scattering Photometer. Filed Jan. 13, 1976. Patented Oct. 11, 1977. Not available NTIS.

Patent 4,053,918. High Voltage, High Current Schottky Barrier Solar Cell. Filed Aug. 5, 1974. Patented Oct. 11, 1977. Not available NTIS.

Patent 4,055,686. Method of Forming Metal Hydride Films. Filed Feb. 20, 1976. Patented Oct. 25, 1977. Not available NTIS.

Patent 4,055,764. Optically Selective, Acoustically Resonant Gas Detecting Transducer. Filed Dec. 22, 1975. Patented Oct. 25, 1977. Not available NTIS.

Patent 4,055,847. Germanium Coated Microbridge and Method. Filed Aug. 13, 1976. Patented Oct. 25, 1977. Not available NTIS.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF APRIL 22, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-3-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-16-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	8-1-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	5-25-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	6-13-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	2-2-77
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	11-19-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	3-9-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	9-27-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	3-7-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	7-26-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-7-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	3-9-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	6-13-77

Expiration of patents: The patents within the range of numbers indicated below expire during April 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,977,598 to 2,981,953, inclusive
Plant Patents..... Numbers 2,040 to 2,054, inclusive

REISSUES

MAY 16, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,630
FIRE RESISTANT FABRICS

Robert Edward May, Pleasant Garden, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Original No. 3,934,285, dated Jan. 27, 1976, Ser. No. 172,212, Aug. 16, 1971. Application for reissue Sep. 17, 1976, Ser. No. 724,369

Int. Cl.[2] **A47C** *27/12;* **B05D** *3/12*

U.S. Cl. 5—345 R **14 Claims**

1. A fire retardant textile product comprising a mattress batting assembly which is normally susceptible to burning by a cigarette and a fire retardant fabric positioned on said batting assembly to retard burning thereof, said fabric having a heat conductive coating on its underside adjacent to and in contact with said assembly, said coating comprising a flexible, film-forming polymeric binder having dispersed therein from 30–60% by weight of a flake- or leaf-shaped heat conductive material selected from the group consisting of aluminum and graphite of from 50–400 mesh, the weight of the coating being at least about 2 ounces per square yard of fabric and the amount and size of said heat conductive material and the thickness of said coating being sufficient to carry away the heat of a cigarette falling or placed on the topside of said fabric so as to avoid burning or substantial charring of said assembly.

9. A fire retardant textile product comprising an upholstery batting assembly which is normally susceptible to burning by a cigarette and a fire retardant fabric positioned on said batting assembly to retard burning thereof, said fabric having a heat conductive coating on its underside adjacent to and in contact with said assembly, said coating comprising a flexible, film-forming polymeric binder having dispersed therein from 30–60% by weight of a flake- or leaf-shaped heat conductive material selected from the group consisting of aluminum and graphite of from 50–400 mesh, the weight of the coating being at least about 2 ounces per square yard of fabric and the amount and size of said heat conductive material and the thickness of said coating being sufficient to carry away the heat of a cigarette falling or placed on the topside of said fabric so as to avoid burning or substantial charring of said assembly.

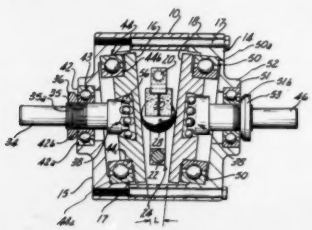
Re. 29,631
INFINITELY VARIABLE TRANSMISSION WITH LUBRICATING WICK MEANS

Lawrence A. Schott, 13930 Stansbury, Detroit, Mich. 48227

Original No. 3,800,606, dated Apr. 2, 1974, Ser. No. 271,248, Jul. 13, 1972. Application for reissue Apr. 1, 1976, Ser. No. 672,769

Int. Cl.[2] **F16H** *13/02, 13/04, 13/10*

U.S. Cl. 74—198 **6 Claims**



1. A motion transmitting mechanism comprising a pair of shafts, a pair of *parallel* discs mounted spaced from each other with their faces mutually angularly inclined, the axes of rotation of said discs being offset by a predetermined distance, *thrust bearing means supporting said discs,* a ball in engagement with the [surface] *face* of each of said discs, and guiding means for said ball comprising a pair of spaced parallel rod members for linearly displacing said guiding means radially relatively to the faces of said discs to vary the speed at which one disc drives the other, [said guiding means for said ball comprising a wick in contact with the peripheral surface of said ball,] and constant angular velocity coupling means connecting each of said shafts to a different one of said discs, wherein said constant angular velocity coupling means comprises a recessed cupped portion on each disc, a plurality of socket-like *peripheral* pockets formed at the end of each shaft [end], a like plurality of socket-like pockets formed in the opposed surface of the cupped portion of the disc, and a ball disposed in each [of said pairs] *pair* of opposed pockets.

Re. 29,632
ELECTROPHOTOGRAPHIC DEVICE

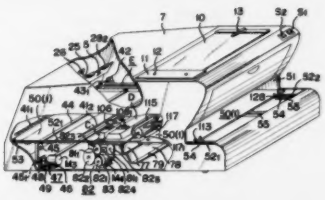
Hiroshi Tanaka, Tokyo; Shinkichi Takahashi, Yokohama; Tetsuo Hasegawa, Tokyo, and Toshihiko Sato, Kawaguchi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Original No. 3,438,706, dated Apr. 15, 1969, Ser. No. 585,091, Oct. 7, 1966. Application for reissue Apr. 14, 1971, Ser. No. 133,990

Claims priority, application Japan, Oct. 11, 1965, 40-62246; Oct. 27, 1965, 40-65491; Mar. 23, 1966, 41-17781; Mar. 23, 1966, 41-17782; Jun. 14, 1966, 41-38695; Aug. 23, 1966, 41-79861[U]; Aug. 25, 1966, 41-56010; Aug. 31, 1966, 41-57482; Sep. 14, 1966, 41-60332

Int. Cl.[2] **G03G** *15/00, 21/00*

U.S. Cl. 355—11 **31 Claims**



35. A cleaning apparatus for removing electrostatically adhering toner particles remaining on an electrostatic recording surface after transfer of a toner particle image to copy material comprising a resilient scraping blade arranged for engaging along an edge thereof said electrostatic recording surface, said edge extending along the width of said electrostatic recording surface, holder means for holding said resilient scraping blade and maintaining its engaging edge in contact with the surface of said electrostatic recording member to scrape toner particles, means for establishing relative movement between said electrostatic recording surface and said resilient scraping blade, and means for removing toner particles scraped up by said scraping blade to a collection source whereby said toner particles can be reused.

Re. 29,633

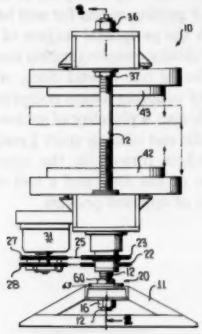
MECHANISM FOR MAINTAINING ALIGNMENT BETWEEN TWO RELATIVELY MOVABLE MEMBERS

Kenneth T. MacMillan, 4992 Wesleyan Woods Dr., Macon, Ga. 31204

Original No. 3,990,822, dated Nov. 9, 1976, Ser. No. 635,075, Nov. 25, 1975. Application for reissue Jun. 14, 1977, Ser. No. 806,451

Int. Cl.[2] B29H 5/04

U.S. Cl. 425—25 16 Claims



17. A mechanism comprising a pair of relatively movable members, a pair of screw means extending between and connected to said members for moving said members relative to each other, means fixing said screw means against axial movement relative to one of said members, feed means carried by said screw means for actuation in unison to effect movement of the other of said members between parallel positions, and means for axially shifting one only of said screw means relative to its respective feed means for varying the angular relationship between said members, while said one screw means remains fixed against axial movement.

Re. 29,634

DENTIFRICE CONTAINING VISIBLE AGGLOMERATED PARTICLES OF POLISHING AGENTS

Francis D. Roberts, West Millington, N.J., and John J. Steinke, III, Fayetteville, N.Y., assignors to Colgate Palmolive Company, New York, N.Y.

Original No. 3,574,823, dated Apr. 13, 1971, Ser. No. 750,028, Aug. 5, 1968. Continuation of Ser. No. 224,629, Feb. 8, 1972, abandoned. Application for reissue Aug. 15, 1975, Ser. No. 604,997

Int. Cl.[2] A61K 7/18, 7/22

U.S. Cl. 424—57 36 Claims

1. A *transparent* toothpaste comprising (I) a dental vehicle comprising water, a humectant and a gelling agent and (II) about 5–75% by weight of said *transparent* toothpaste of visible, palpable particles of substantially water-insoluble agglomerated material consisting essentially of material selected from the group consisting of (a) water-insoluble dental polishing agent; (b) mixtures of about 75–98% by weight of water-insoluble dental polishing agent with (b–1) water-soluble binding agent, (b–2) water-soluble binding agent and a lubricant, (b–3) water-soluble binding agent and a non-abrasive diluent, and (b–4) water-soluble binding agent, a lubricant and a non-abrasive diluent; and (c) mixture of about 99% by weight of water-insoluble dental polishing agent with a lubricant.

PLANT PATENTS

GRANTED MAY 16, 1978

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,251
CHRYSANTHEMUM PLANT NAMED IMPERIAL WHITE

Satoru Iwasaki, 2519 Pulgas Ave., East Palo Alto, Calif. 94303

Filed Feb. 2, 1977, Ser. No. 765,107
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—77 1 Claim

1. A new and distinct cultivar of chrysanthemum plant, substantially as herein shown and described, characterized by the larger size of its blooms and foliage, when compared with its parent plant, and the greater height and size of its flowering stems.

4,252
CHRYSANTHEMUM PLANT NAMED TOPAZ

Kerry S. Petusky, West Chicago, Ill., assignor to Pan-American Plant Company, West Chicago, Ill.

Filed May 9, 1977, Ser. No. 795,308
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—78 1 Claim

1. A new chrysanthemum cultivar, substantially as herein shown and described, characterized by its very large flower size, its uniform 9-week year around response, and its tolerance to high soluble salt conditions.

4,253
PLANT OF THE FERN FAMILY

Elizabeth R. Arnold, 3846 Loretto Rd., Jacksonville, Fla. 32223

Filed May 19, 1977, Ser. No. 798,607
Int. Cl.[2] A01H *9/00*
U.S. Cl. Plt.—88 1 Claim

1. The new and distinct plant variety of Boston fern substantially as herein described and characterized by a growth habit which provides specimens with repeatedly dissected leaves with short divisions and small variable pinnules and that appears as a dense fluffy dome-shaped mass of entangled leaves, and that, in comparison to *Nephrolepis exaltata* cv. Smithii and cv. Fantasia, has leaves which become pendant at an earlier age and which tend to continue to be bent abaxially, has divisions of the blade which so crowd into each other and into adjacent leaflets and leaves as to form a thicker, denser and fluffier mass, and has pinnules with laminae predominantly more narrowly linear, irregularly pinnatifid or dichotomously branched, the overall color of said specimens being substantially moderate yellow green.

PATENTS

GRANTED MAY 16, 1978

ERRATA

For CLASS	See PATENT NO.
023–277 C	4,089,088
123–200	4,089,162
400–125.1	4,089,401
400–625	4,089,402
214–304	4,089,435
215–329	4,089,463
220–004 A	4,089,464
220–400	4,089,465
220–454	4,089,466
220–334	4,089,467
220–441	4,089,468
366–102	4,089,507
366–007	4,089,508
366–008	4,089,509
366–083	4,089,510
272–122	4,089,528
536–004	4,089,606
432–080	4,089,634
343–713	4,089,817
544–373	4,089,853
544–353	4,089,859
544–295	4,089,860
544–369	4,089,861
560–188	4,089,891
310–331	4,089,927
536–028	4,090,021
536–057	4,090,022
358–130	4,090,031
364–494	4,090,065
362–419	4,090,210

PATENTS

GRANTED MAY 16, 1978

GENERAL AND MECHANICAL

4,089,064

PROTECTIVE ATHLETIC PANTS HOSE

Franklin Woodrow Chandler, Jr., P.O. Box 712, Reform, Ala. 35481

Filed Jan. 19, 1976, Ser. No. 650,563
Int. Cl.[2] A41D *13/06;* **A41B** *9/00*
U.S. Cl. 2—2 **2 Claims**

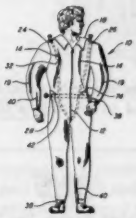
1. A pants type hose garment having knee joint support devices; said garment comprising at least one layer of elastic fabric formed of a contractile material and adapted to be expanded and engaged over the hips and legs of the wearer; said garment having functional items for support of the knee joint on the leg portions of said hose and including a knee grip positioned to overlie and support the knee joint and adjoining leg connections, said knee grip including an upper connecting band positioned above the knee, a lower connecting band positioned below the knee and a plurality of inelastic cords extending between and connected to each of said connecting bands, a number of said inelastic cords extending in a clockwise direction from their points of connection with one of said connecting bands for a distance of one and one-half times around the circumference of the knee grip to the points of connection at the other connecting band, a substantilly equal number of said inelastic cords extending in a counterclockwise direction for the same distance and being interlaced with said clockwise extending cords, whereby when the distance between the connecting bands comprising the ends of the knee grip decreases the diameter of the knee grip increases or vice versa; a waistband; inelastic substantially vertically extending connecting cords extending between and connected to said waistband and said upper connecting band for holding said upper connecting band in the same relative position on the wearers legs; a foot portion on each leg portion including a toe cap; inelastic substantilly parallel and vertically extending connecting cords in said elastic fabric layer extending between and connected to said toe caps and said lower connecting bands, whereby movement of the wearers feet operate to move said lower connecting bands along the length of the wearers legs to continuously constrain the knee grip into engagement with the knee joint.

4,089,065

CLOTHING FOR PROVIDING PROTECTION AGAINST FORCEFUL IMPACT

Michael Henry McGee, 412 E. Kingston Ave., Charlotte, N.C. 28203

Filed Oct. 28, 1976, Ser. No. 736,590
Int. Cl.[2] A41D *13/00*
U.S. Cl. 2—2 **17 Claims**



1. An inflatable garment for use in dangerous activities which when uninflated allows freedom of movement and has the appearance of an attractive article of clothing and when inflated provides protection from injury due to forceful impact comprising:

(a) a strong abrasive-resistant article of clothing comprising a fabric made of two coextensive layers of material which provide substantial resistance to the flow of a gas therethrough, such that said article of clothing is inflated when a gas under pressure is provided to the space between said layers, heavy-duty seams for resisting rupture due to impact when said article of clothing is inflated, and heavy-duty closing means for securing the article of clothing around the wearer to provide protection against said clothing opening as a result of a forceful impact;

(b) means for containing a gas under pressure;

(c) means for connecting said space between said two coextensive layers of material to said means for containing a gas under pressure, said connecting means suitable for transferring a gas under pressure;

(d) means for releasing pressurized gas from said container means, through said connecting means and into said space between said two coextensive layers of material to inflate said article of clothing, thereby protecting the wearer from injury due to forceful impact; and

(e) a multiplicity of means for releasably fastening said two coextensive layers of material so that said layers will not shift and separate during normal wear, but will release when said pressurized gas is provided between said layers to allow said garment to inflate.

4,089,066

FINGERNAIL PROTECTOR

Margaret L. Dethman, 2900 Fry St., Boise, Id. 83704

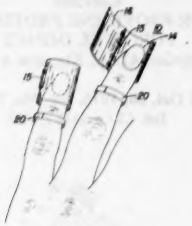
Filed May 9, 1977, Ser. No. 794,749
Int. Cl.[2] A41D *13/00*
U.S. Cl. 2—21 **3 Claims**

1. A fingernail protector comprising:

a finger support flange;

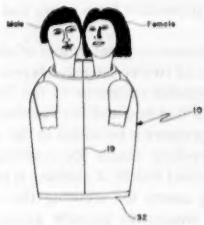
a semicircular shell secured adjacent a terminal end of said flange;

a semicircular cover supported by said shell whereby said shell and said cover define a cylinder;
hinge means connecting said shell to said cover; and



a finger strap secured to the terminal free end of said flange, said strap adapted to encircle a finger and attach upon itself.

4,089,067
SHIRT
Rebecca L. Velasco, 11249 Bootes, San Diego, Calif. 92126
Filed May 9, 1977, Ser. No. 794,956
Int. Cl.[2] A41D *1/00*
U.S. Cl. 2—69 **7 Claims**

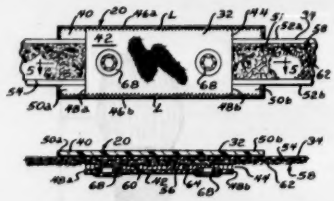


1. An article of wearing apparel comprising:
a tubular body portion whose axis would be substantially vertically oriented when being worn by a human;
said tubular body portion having a front section and a back section;
said tubular body portion having a top, middle, and bottom area; and
at least four arm sections extending outwardly from said tubular body portion somewhere between its top and middle area, at least two of said arm sections extending from said front section and at least two of said arm sections extending from said back section.

4,089,068
APPAREL WITH BELT ASSEMBLY
Roger T. Swallow, Crystal Lake, Ill., assignor to The Kendall Company, Boston, Mass.
Division of Ser. No. 676,607, Apr. 13, 1976, Pat. No. 4,054,952.
This application May 23, 1977, Ser. No. 799,481
Int. Cl.[2] A41B *9/14*
U.S. Cl. 2—76 **9 Claims**

1. Wearing apparel, comprising:
a garment;
an elongated belt;
a section of material attached to the garment and defining a tunnel to receive the belt, said belt and tunnel having surfaces comprising hook and loop fastening strips interengaging in the tunnel to permit selective adjustment of the belt relative the garment.

3. Wearing apparel, comprising:
(a) a garment;
(b) a belt assembly comprising,
(1) a housing having first and second walls defining an elongated tunnel in the housing, with said first wall having first surface restraining means in the housing; and
(2) an elongated belt passing through the housing tunnel and having second surface restraining means facing said first surface means, with the size of the tunnel between the first and second walls being sufficiently small relative the thickness of the belt for the second housing wall



to maintain the second surface means of the belt in close engagement with the first surface means of the housing, said first and second surface means interengaging and cooperating to provide substantial restraint against movement of the belt through the housing tunnel and normally retain the belt at a selected position in the housing, and said first and second surface means releasing sufficiently to permit movement of the belt through the housing tunnel responsive to relatively large forces applied against the belt; and
(c) means for attaching the housing to the garment.

4,089,069
WEARING APPAREL AND METHOD OF MANUFACTURE
Maris Vistins, Coshocton, Ohio, assignor to Becton, Dickinson and Company, Rutherford, N.J.
Filed Feb. 11, 1977, Ser. No. 767,849
Int. Cl.[2] A41D *19/00*
U.S. Cl. 2—161 R **3 Claims**

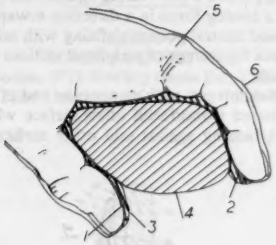
1. A wearing apparel garment prepared by
providing a base fabric which comprises a textile fabric substrate having one napped surface, the fibrous naps thereof having a height of from ½ inch to 1 inch;
fabricating a garment from said fabric; and
coating the outer surface of said garment with an elastomeric resin.

4,089,070

CONFORMING GRIP GLOVE

Kenneth F. Cherry, 1533 Eastgate, Toledo, Ohio 43614

Filed Mar. 9, 1977, Ser. No. 775,849
Int. Cl.[2] A41D *19/00*
U.S. Cl. 2—161 A 4 Claims



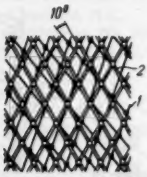
1. An improvement in gloves comprising a hand grip enhancing device having in combination:
an outter membrane in the shape of a conventional glove
an inner membrane in the shape of a conventional glove said inner membrane located inside said outter membrane
a conforming material of varing thickness between said inner membrane and said outter membrane, the variable thickness of the conforming material being proportional to the void formed between the hand and a handle device, the proportional thickness of the conforming material resulting from curing of the conforming material while the device is worn on the hand and the hand is gripping a handle.

4,089,071

MATERIAL FOR MAKING BONE ENDOPROSTHESIS AND ENDOPROSTHESIS MADE OF SAID MATERIAL

Viktor Konstantinovich Kalnberz, ulitsa Stendera, 13, kv. 2; Kharald Arnoldovich Yanson, ulitsa Tereshkovoi, 31a, kv. 88; Ivar Valterovich Knets, ulitsa Ezermalas, 20, kv. 4, and Jury Zhanovich Saulgozis, bulvar Imanta, 22, kv. 26, all of Riga, U.S.S.R.

Filed Sep. 8, 1976, Ser. No. 721,406
Int. Cl.[2] A61F *1/24*
U.S. Cl. 3—1.9 13 Claims



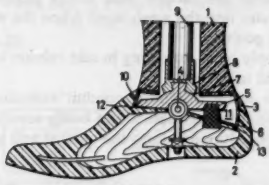
1. A material for making bone endoprostheses, featuring a laminated structure and comprising: a reinforcing base made as a number of nets, some of which are of a chemically and biologically inert metal or alloy, while the other nets are of a chemically and biologically inert polymeric material; an antiseptic-doped binding agent occupying the whole space confined within said nets; the volumetric ratio between said metallic nets and the entire material being selected such that the modulus of elasticity of the material approximates that of the bone tissue.

4,089,072

PROSTHETIC APPLIANCE

Richard Glabiszewski, Duderstadt, Germany, assignor to Otto Bock Orthopädische Industrie K.G., Duderstadt, Germany

Filed Jul. 13, 1976, Ser. No. 704,782
Claims priority, application Germany, Jul. 18, 1975, 7522922[U]
Int. Cl.[2] A61F *1/04, 1/08, 1/06*
U.S. Cl. 3—30 7 Claims



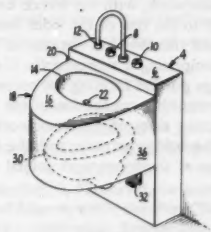
1. In a prosthetic appliance, a combination comprising an elongated supporting part having an end portion and including a tubular element; an extremity-shaped part articulated to said end portion of said supporting part and having a circumferential rim bounding a depression; a sheath of a resiliently yieldable material surrounding at least a portion of said supporting part; and means for connecting said sheath to said extremity-shaped part, including a cup-shaped element permanently connected to said sheath, snugly received in said depression, and detachably circumferentially held in the latter by said rim, said cup-shaped element bounding a compartment in said depression in which said end portion of said supporting part is received and having an opening through which said tubular element passes from said compartment into a space bounded by said sheath, said opening having such dimensions as to permit said supporting part to tilt relative to said cup-shaped element and to said extremity-shaped part.

4,089,073

COMBINATION FIXTURE WITH SWING-OUT LAVATORY

J. Les Campbell, Burlingame, Calif., assignor to Aluminum Plumbing Fixture Corp., Burlingame, Calif.

Filed Sep. 29, 1976, Ser. No. 727,720
Int. Cl.[2] E03D *11/00, 11/13*
U.S. Cl. 4—3 2 Claims



1. A combination fixture comprising in combination:
a. a cabinet having a top surface, a front surface, and a generally planar rear surface adapted to be mounted flush against a substantially flat wall surface;
b. a wash basin hingedly connected at one edge thereof to one edge of said cabinet, whereby it can be swung in a horizontal plane from a first position against the front surface of the cabinet to a second position at substantially right angles to said cabinet;
c. said wash basin having a top surface with a wash bowl therein;
d. a toilet mounted on the front surface of said cabinet and

extending outwardly therefrom, said wash bowl overlying said toilet in the first position and extending clear of the toilet when in the second position;

e. a skirt on said wash basin extending downwardly from the front and sides of said wash basin, said skirt extending downwardly from the top of said wash basin to below the top of said toilet whereby said skirt conceals the toilet when the wash basin is in the first position;

f. a water outlet faucet and hot and cold water control knobs supported on the cabinet, said faucet positioned to discharge water into the wash bowl when the wash basin is in its first position;

g. water supply pipes extending in said cabinet to said faucet and to said toilet; and

h. a flexible water discharge conduit extending from the wash basin into the cabinet and being separate from the hinged connection between the cabinet and wash basin.

4,089,074

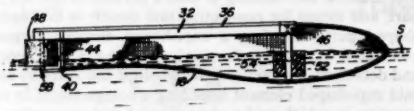
LEAF SKIMMER FOR POOLS

Charles E. Sermons, Rte. 4, Box 122-A, Pensacola, Fla. 32504

Filed Nov. 3, 1976, Ser. No. 738,360

Int. Cl.[2] E04H *3/16, 3/18*

U.S. Cl. 4—172 **5 Claims**



1. A leaf skimmer for swimming and similar pools of water, comprising, in combination:

(a) floating means for placement on a water surface adjacent to and upstream of a water circulating drain of an associated pool; and

(b) screen means attached to the floating means and immersed in the water for collecting debris in the proximity of the surface of the water of the pool, the floating means including a framework comprising a plurality of sides surrounding and forming a hollow interior of the framework, the screen means being disposed extending beneath the sides of the framework and under the hollow interior, formed by the framework, the one of the sides of the framework forming an access opening to the hollow interior of the framework, with the screen means comprising a net attached to the one of the sides beneath the access opening formed thereby, and the one of the sides of the framework comprising a substantially U-shaped member having a bridge portion forming the access opening and a pair of legs permitting connection of the U-shaped member to connecting sides of the framework, the net being attached to the bridge portion and the legs being connected to sides of the framework joined with the one of the sides.

4,089,075

HOLDER

Marvin I. May, 960 Second St., Hermosa Beach, Calif. 90254

Continuation of Ser. No. 710,435, Aug. 2, 1976, abandoned, which is a continuation-in-part of Ser. No. 622,677, Oct. 15, 1975, Pat. No. 3,973,282. This application Aug. 11, 1977, Ser. No. 823,836

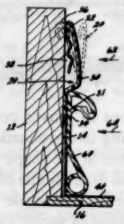
Int. Cl.[2] A47C *27/08*

U.S. Cl. 5—370 **3 Claims**

1. A holder for constraining movement of a sheet of material between itself and another surface to which the holder is attached, said holder comprising a single piece of resilient material having a leg portion for bearing against said other surface and for positioning and securing said holder, said leg portion being positioned to induce a stress in said holder wherein a spring-like quality is achieved;

a central portion having an end integral with said leg portion and being bowed outwardly from said other surface when said leg portion is positioned to bear against said other surface, said central portion being stressed by the position of said leg portion when bearing against said other surface to cause a biasing force in a direction toward said other surface, said central portion defining with said other surface a space for storage of peripheral sections of said sheet of material;

a head portion integral with an opposite end of said central portion biased toward said other surface when said leg portion is bearing against said other surface, said head



portion being pivotal away from said other surface upon insertion of an operator's fingertips between said other surface and said head portion and operative to squeeze said sheet of material between it and said other surface and to obstruct removal of said sheet of material, said head portion for receiving said sheet of material in a circumscribed manner;

an inner surface extending in common between said leg portion and said central portion positioned to contact said other surface at said leg portion; and

a smooth outer surface extending in common between said leg portion and said central portion for supporting said sheet of material and for being hidden thereby, said outer surface being located so as to remain in a non-contacting position relative to said other surface.

4,089,076

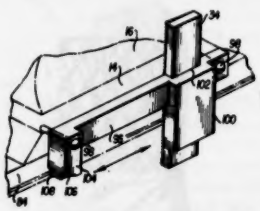
SKI SERVICING AND REPAIRING TOOL

James D. Sparling, 20 E. Center St., Rutland, Vt. 05701

Filed Mar. 4, 1976, Ser. No. 663,973

Int. Cl.[2] B23D *67/12;* **A63C** *11/04*

U.S. Cl. 7—158 **10 Claims**



1. A ski servicing and repairing tool, comprising:

a hand held unit including a handle portion adapted to be grasped in the palm of a hand and a base plate attached to said handle portion and having upper and lower principal surfaces, the upper of which abutts said handle portion and the lower of which has a longitudinal groove and a transverse groove extending the length and width, respectively, of said base plate, said transverse groove being dimensioned so as to receive a flat file and

a guide member detachably securable to one longitudinal lateral surface of said base plate and having a pair of downwardly projecting legs, one of said legs being provided with a groove of substantially the same cross-sectional dimensions as said transverse groove of said base plate for holding said file in a position normal to the plane of said lower principal surface.

4,089,077

COMBINATION TOOL

Arthur P. Morton, 2712 Bowling Green Dr., Vienna, Va. 22180

Filed Oct. 13, 1976, Ser. No. 732,066
Int. Cl.[2] B25F *1/00*
U.S. Cl. 7—138 6 Claims

1. A combination tool to facilitate the removal of a propeller from a propeller shaft of a motorboat engine comprising a wrench-end portion and a prying-end means, said wrench-end portion and said prying-end means being connected by a neck portion, said wrench-end portion containing an aperture which is adapted for engagement with a nut disposed on the propeller shaft, said aperture lying in a different plane than said neck portion and said prying-end means containing an upper tooth member disposed on the end of the prying-end means and a lower lip member disposed intermediate the upper tooth member and the neck portion, said upper tooth member and said lower tooth member being joined by an intermediate member, said upper tooth member and said lower lip member disposed in the same plane and projecting in substantially the same direction from said intermediate member to form a mouth portion at said prying-end means, and said lower lip member having a continuous working surface which enables it to provide for sliding engagement with the propeller shaft, said upper tooth member and said lower lip member cooperating to facilitate said removal of the propeller from the propeller shaft.

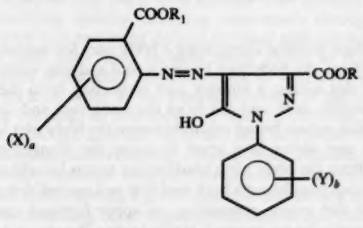
4,089,078

ARYLAZOPYRAZOLONE DYES FOR POLYESTER

Raouf Botros, Beech Creek, Pa., assignor to American Color & Chemical Corporation, Charlotte, N.C.

Filed Jun. 4, 1976, Ser. No. 692,931
Int. Cl.[2] C09B *29/38;* D06P *1/04, 1/18*
U.S. Cl. 8—41 C 5 Claims

1. A dye of the formula:



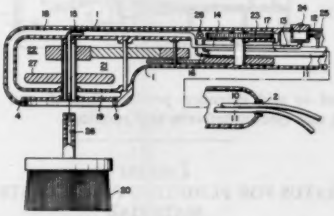
in which R and R_1 are independently lower alkyl, X is a member selected from the group consisting of hydrogen, halogen, nitro, hydroxy, lower alkyl and lower alkoxy, Y is hydrogen, halogen, lower alkyl or nitro, and *a* and *b* are integers ranging from 1 - 2.

4,089,079

ROTARY WASHING BRUSH DEVICE

Lincoln E. Nicholson, Brooklyn, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Sep. 7, 1976, Ser. No. 721,079
Int. Cl.[2] A46B *13/06*
U.S. Cl. 15—29 3 Claims



1. A rotary washing brush shower device, comprising

a housing having an inlet opening and a plurality of mutually spaced outlet openings spaced from the inlet opening, said housing having watertight duct means extending from the inlet opening to the outlet openings whereby water under pressure supplied to the inlet opening is provided at the outlet openings;

a brush having a hollow shaft rotatably mounted on the housing at the outlet openings in a manner whereby water from the outlet openings is provided around the brush, said hollow shaft being removably mounted in the housing;

a watertight compartment in the housing having an inlet opening in communication with the duct means extending from the housing inlet opening and an outlet communicating with the duct means extending to the housing outlet openings;

hydro motor means in the watertight compartment in the housing at the inlet opening and coupled to the brush whereby a flow of water through the duct means rotates the hydro motor means and thereby rotates the brush; and

a flywheel mounted on the hollow shaft and rotatable therewith for continuing the rotation of said shaft.

4,089,080

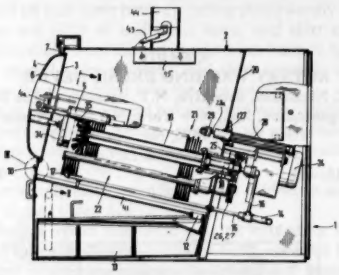
MACHINE FOR TREATING HOLLOW BOWL-SHAPED OBJECTS

Rio Beer, Unterdorfstr. 5, Niederwil, Switzerland (CH-5524)

Filed Mar. 4, 1977, Ser. No. 774,410
Claims priority, application Switzerland, Mar. 24, 1976, 3695/76
Int. Cl.[2] A47L *15/38*
U.S. Cl. 15—56 13 Claims

1. A machine for treating hollow bowl-shaped objects, particularly for washing kettles or the like, comprising a housing defining a chamber and having an opening for introduction of objects into and removal of treated objects from said chamber; at least one driven treating implement mounted in said housing and arranged to treat an object in said chamber; and means for removing treated objects from said chamber, including an ejector movable between a retracted position in which said ejector is remote from said opening and permits insertion of an object into said chamber and into the range of said implement,

and an extended position nearer to said opening whereby the ejector expels a treated object during movement from said



retracted to said extended position thereof, and means for moving said ejector between said positions.

4,089,081

APPARATUS FOR PURIFYING PARTICULATE MOULD MATERIAL

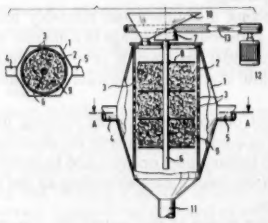
Hermann Jacob, Fachenfelderweg 115, 2105 Seevetal 3, Germany

Filed Jan. 29, 1975, Ser. No. 545,014

Claims priority, application Germany, Feb. 1, 1974, 2404702; Dec. 20, 1974, 2460594

Int. Cl.² C10B *43/04*

U.S. Cl. 15—93 R **4 Claims**



1. Apparatus for purifying particulate material, comprising a tube defining a chamber, said tube having inlet and outlet means for supplying said particulate material into and out of said chamber; finely divided metallic material within said chamber, said finely divided metallic material defining a plurality of voids formed by a plurality of sharp edges; input means for uniformly feeding said particulate material into said tube and into said finely divided metallic material; output means for removing said particulate material from said tube, said particulate material brushing against said finely divided metallic material to thereby remove foreign matter carried by said particulate material, and said tube having air inlet and outlet means in communication with an air source for evacuating said removed foreign matter out of said tube; and vibratory means for vibrating said finely divided metallic material.

4,089,082

MULTI-POSITION PAINT ROLLER FRAME

James D. McGrew, 7430 1/2 Girard, La Jolla, Calif. 92037

Continuation-in-part of Ser. No. 660,158, Feb. 23, 1976, abandoned. This application Jul. 1, 1977, Ser. No. 812,167

Int. Cl.² B05C *17/02*; B25G *3/38*

U.S. Cl. 15—230.11 **4 Claims**

1. A multi-position paint roller frame comprising:

(a) a shank;

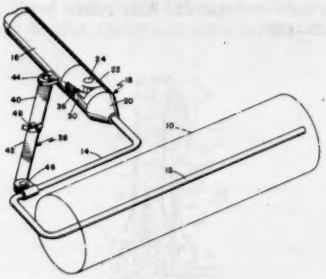
(b) a roller support bar pivotally mounted to said shank;

(c) said roller support bar establishing an axis for a paint roller and being pivotal such that said axis defines a variable angle with said shank;

(d) an elbow brace defined by two legs pivoted together at one end to define a central pivot point of said elbow brace;

(e) said shank, legs and roller support bar portion establishing the roller axis lying substantially in one plane and movable relative to each other in said plane;

(f) said elbow brace being pivotally mounted to and between said shank and said roller support bar and the legs being of a size such that the following three angular orientations of said axis relative to said shank are alternatively possible;



(i) a 0° deflection position wherein said axis and shank are perpendicular and said elbow brace is straight;

(ii) a position of maximum deflection of said roller axis wherein the central pivot point of said elbow brace is thrust rearwardly essentially against and supported by said shank;

(iii) a position intermediate the positions described in (i) and (ii) wherein said central pivot is forwardly thrust to rest substantially against and support said roller support bar; and

(g) means to maintain the legs in a selected adjusted position.

4,089,083

DOOR ARRESTORS

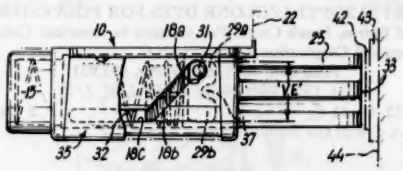
Melvyn Wilde, 21 Lime Grove, Lowton, Warrington, and Robert John Sutton, 50 Westbourne Rd., Southport, both of England

Filed Apr. 1, 1977, Ser. No. 783,566

Claims priority, application United Kingdom, Aug. 24, 1976, 35110/76; Sep. 23, 1976, 39452/76

Int. Cl.² E05F *5/02*

U.S. Cl. 16—82 **6 Claims**



1. A door arrestor comprising a body part for mounting on a door frame, the body part having a roof and side walls defining first slot means; a plunger part projecting from the body part, movable in to and out from the body part and defining second slot means; spring means between the body part and the plunger part acting in a sense to cause the plunger part to project from the body part; headless pin means loosely carried in and extending through both said first and second slot means; said first slot means comprising an upper forward cavity in which cavity the pin means is located when the plunger part is fully projecting from the body part, a rearwardly extending downward incline from said cavity down which the pin means can move as the plunger part moves into the body part, and a

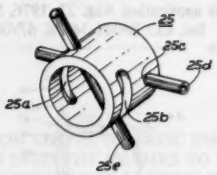
travelway at the base of the incline extending towards the rearward lower regions of said side walls; and said second slot means comprising, rearward in the plunger, a vertical fall cavity for the pin means; one of said slot means comprising a buttress wall against which the pin means can strike to arrest the plunger part when the plunger part moves into the body part above a threshold velocity and which the pin means can pass to permit the plunger part to complete its full movement into the body part when the plunger part moves into the body part below said threshold velocity; and a cover part covering both the slot means to confine the pin means in said slot means.

4,089,084

INTERNAL HINGE

Daniel M. Droz, 6501 Bartlett St., Pittsburgh, Pa. 15217

Filed Jun. 14, 1977, Ser. No. 806,518
Int. Cl.[2] E05D *9/00, 15/00, 11/10*
U.S. Cl. 16—128 R **12 Claims**



1. An internal hinge for use with at least a first and second member comprising:

a. a generally tubular means having a first part adapted to be inserted into a first aperture formed in said first member and a second part adapted to be inserted into a second aperture in said second member, said apertures being aligned and adjacent one another, said tubular member having a slot means formed in the periphery of said first part, said tubular member also having means formed in said second part for enabling said second part to be connected to said second member, and

b. retaining means adapted to engage said first member and said slot means for connecting said first member to said first part.

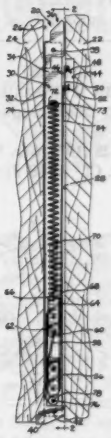
4,089,085

SASH BALANCES AND COMPONENTS THEREOF

Jack R. Fitzgibbon, Sioux Falls, S. Dak., assignor to Balance Systems, Inc., Sioux Falls, S. Dak.

Filed Mar. 28, 1977, Ser. No. 781,976
Int. Cl.[2] E05D *17/00*
U.S. Cl. 16—197 **17 Claims**

1. A pulley block unit adapted for increased ease of assembly and for cooperation, in the assembled state thereof, with a force exerting element to form a window sash balance assembly, said pulley block unit including a pulley-receiving frame, at least one pulley receivable therein, and at least one axle for rotatably supporting said pulley within said frame, said frame having a pair of side walls with exterior wall surfaces and a pulley-receiving opening extending transversely through said pulley block unit and being defined by inner side and end wall surfaces, said inner wall surfaces being joined to first and second pairs of assembly reference surfaces which are spaced apart from each other by the transverse extent of said pulley-receiving opening, an axle-receiving opening disposed in and extending through said side walls and into said pulley-receiving opening, said axle-receiving opening being disposed generally centrally between said pairs of assembly reference surfaces, said pulley having a given diameter and having circumferentially extending outer edge portions and an axle-receiving opening extending therethrough generally centrally thereof, said axle-receiving opening in said pulley including a main diameter portion and an enlarged pilot diameter portion joined to said main diameter portion by a tapering margin extending between said diameters, said axle including a main diameter portion and a reduced pilot diameter portion joined to said main diameter by a tapering margin, said axle and pulley margins, said given pulley diameter, said extent between said pairs of assembly reference surfaces and the distance between said end wall surfaces of said pulley-receiving opening being sized,



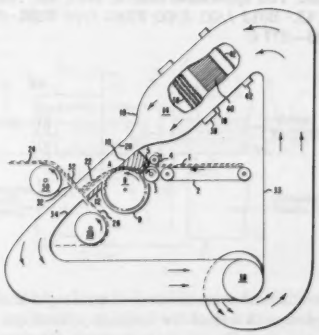
constructed and arranged so that when said pulley is positioned in said pulley-receiving opening, with said outer edge of said pulley in substantially coplanar alignment with one of said pairs of assembly reference surfaces, said tapering margins on said axle and said pulley will mutually engage each other upon movement of said axle through said side wall and into said pulley-receiving opening and said axle-receiving opening in said pulley, respectively.

4,089,086

AIR LAY-DOWN PROCESS FOR PRODUCING UNIFORM LIGHTWEIGHT WEBS FROM TEXTILE FIBERS

Rashmikant Maganlal Contractor, Wilmington, and Sang-Hak Hwang, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 497,046, Aug. 9, 1974, Pat. No. 3,932,915.
This application Dec. 1, 1975, Ser. No. 636,628
Int. Cl.[2] D04H *1/00*
U.S. Cl. 19—305 **1 Claim**



1. In the process of converting a batt of staple fibers to a web by separating fibers from the batt, carrying the fibers through a curved space defined by a toothed rotating surface rotating at

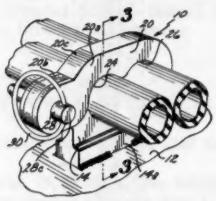
a surface speed of at least 10,000 ft/min and a curved smooth stationary surface spaced less than 0.125 inch from said rotating surface, projecting the fibers from the curved space as a thin fiber stream at an angle of less than 25° into a stable stream of air, separating the fibers of the thin fiber stream from the stable stream of air to form a web, the improvement comprising subjecting said fibers while in said curved space to a higher frequency high turbulence intensity than provided by said curved smooth stationary surface by having said surface have grooves to improve the uniformity of said web.

4,089,087

CLAMP FOR HYDRAULIC HOSES

Leroy Marvin Heitman, 28900 Ironwood, Sunnymead, Calif. 92388

Filed Mar. 25, 1977, Ser. No. 781,179
Int. Cl.² A44B *21/00*
U.S. Cl. 24—81 TH **5 Claims**



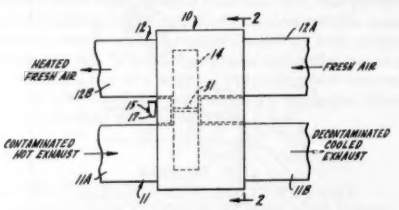
1. A hose clamp comprising in combination,
a base member having opposite end portions and an intermediate portion formed with two substantially half-circle cutouts,
a clamp member pivotally mounted to one end portion of said base member, formed with two substantially half-circle cutouts and a pair of spaced side plates to be positioned on opposite sides of said other end portion of said base member,
and fastening means to engage said other end portion and said side plates to retain said clamp member in position to cause said cutouts to form a pair of full-circle passageways for individually retaining a hose.

4,089,088

THERMAL REGENERATION AND DECONTAMINATION APPARATUS AND INDUSTRIAL OVEN

Ronald L. Konczalski, Grosse Ile, Mich., assignor to Michigan Oven Company, Romulus, Mich.

Continuation-in-part of Ser. No. 705,147, Jul. 14, 1976, abandoned. This application Mar. 2, 1977, Ser. No. 773,495
Int. Cl.² B01J *1/00, 8/00;* F23G *7/06;* F23L *15/02*
U.S. Cl. 23—277 C **16 Claims**



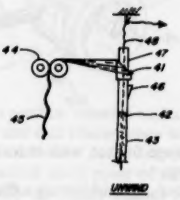
7. In an industrial oven oriented on an elongated vertical axis and equipped with a stack for emitting exhaust gas:
a burner at a predetermined level inside the oven chamber;
a thermal regenerator moveable continuously about a closed path which alternately traverses both a first duct carrying a stream of hot exhaust gas and a second duct carrying a stream of fresher, cooler entrant air thereby to exchange heat between the two gas streams so that the temperature of the outgoing fresh air leaving the regenerator is raised and that of the exhaust gas is lowered;
cycling means to so move the regenerator;
a sensor, for sensing the temperature of one of the streams, combined with control means for varying the rate of movement of the regenerator, to vary the rate of heat exchange, so as to maintain a desired temperature in said one airstream;
and a duct for directing into the oven the outgoing stream of fresh air leaving the regenerator.

4,089,089

METHOD OF UNWINDING

Beryl Aaron Boggs, Chester, Va., assignor to Allied Chemical Corporation, Morris Township, N.J.

Division of Ser. No. 360,237, May 14, 1973, Pat. No. 3,980,176, which is a division of Ser. No. 107,386, Jan. 18, 1971, Pat. No. 3,757,010. This application Aug. 23, 1976, Ser. No. 716,624
Int. Cl.² B65H *54/76, 67/00*
U.S. Cl. 28—299 **5 Claims**



1. A method of unwinding
a package of textile fibers comprising a continuous core of yarn, said yarn being compactly folded within convolutions of a uniform helically, compactly wound mass of yarn, said yarn compressed within a long tube of flexible material, said folded and helically wound mass of said yarn being compressed in said tube so that said mass of said yarn expands after removal of said tube from around said mass
comprising continuously
(a) passing the tube of flexible material over a
(b) rigid tube having rigidly mounted thereon slitting means, and
(c) slitting said tube, while
(d) withdrawing the compacted yarn.

4,089,090

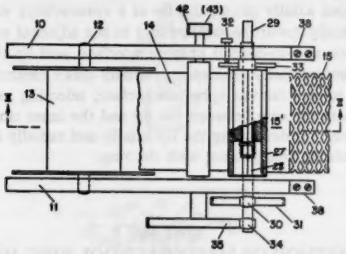
ARRANGEMENT FOR PERFORATING A STRIPE

Johan Eric Hayden Westberg, Lidingo, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden

Filed Feb. 2, 1977, Ser. No. 764,802
Claims priority, application Sweden, Feb. 5, 1976, 7601221
Int. Cl.² B21D *31/04*
U.S. Cl. 29—6.1 **8 Claims**

1. Arrangement for perforating a stripe of a ductile material, such as a plastic or a metal, comprising means for feeding in the stripe between a cutting roll and a holding-up tool, the cutting roll being provided with a plurality of cutting edges in at least one axial row, which cutting edges in cooperation with the holding-up tool make an axial row of slots in the stripe, whereupon the slot walls are expanded simultaneously with withholding other parts of the stripe for forming a lattice with slots expanded in the longitudinal direction of the stripe, said cutting roll being rotatable and provided with a plurality of cutting plates disposed in at least one axial row, each one of said plates being formed by a partly cylindrical mantel surface and two

angled cutting edges, whereas the holding-up tool has an extension in the longitudinal direction of the stripe which is



smaller than the extension of the cutting plates in the peripheral direction of the cutting roll.

4,089,091

APPARATUS FOR THE AUTOMATIC INSERTION OF DIAPOSITIVES INTO THE FRAMES TO BE USED IN STEREOPTICON LANTERNS

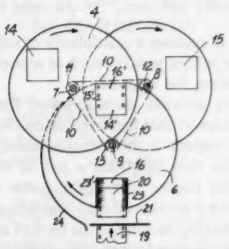
Pietro Alberto, Via Lamarmora, 16, Biella, Italy

Filed Dec. 10, 1976, Ser. No. 749,397

Claims priority, application Italy, Dec. 30, 1975, 30865 A/75

Int. Cl.[2] B23P *21/00*

U.S. Cl. 29—785 **10 Claims**



1. Apparatus for automatically inserting diapositives into the frames to be used in stereopticon lanterns, which comprises three partially overlapping horizontal discs each of them laying on a different plane, being pivotably mounted about a respective one of three vertical central pivots and provided with a number *n* of openings mutually spaced of 360°:*n* around each respective one of said central pivots, each of said pivots being rotary operated by mutually synchronized motor means whereby at each angular rotation of 360°:*n* one opening for each disc will assume a position directly coinciding with one opening of each of the other discs, in the middle of the zone where the three discs are overlapped, said openings being substantially coextensive; a ram means being provided to give a downwardly directed thrust at said opening coincidence zone, and actuated to operate whenever such coincidence occurs at every 360°:*n* angle; there being further provided, at the bottom of the lowest positioned disc, means adapted to form a continuous, closed base of the openings formed on said lower disc, directly in contact with the lower surface thereof, said base means being interrupted at a discharge zone, wherein said opening is bottomless and which is positioned past said overlap and coincidence zone in the sense of rotation of said lower disc.

4,089,092

METHOD OF SUSPENDING ELECTRICAL COMPONENTS

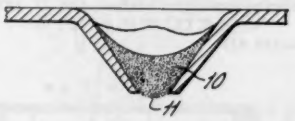
Claude Jeanguenin, Delemont, and Michel Jeannot, Neuchatel, both of Switzerland, assignors to Societe Suisse pour l'Industrie Horrlogere (SSIH) Management Services S.A., Bienne, Switzerland

Continuation of Ser. No. 578,914, May 19, 1975, abandoned.

This application Jan. 11, 1977, Ser. No. 758,517

Int. Cl.[2] H01L *41/22*

U.S. Cl. 29—25.35 **8 Claims**



1. Method of suspending electrical components by electrically conducting leads comprising the steps of:

forming at least one hollow cone-like protuberance in the material of the leads transverse to the length thereof;

forming an opening in the apex end of said protuberance thereby to provide a funnel,

placing a predetermined quantity of a soldering alloy in said funnel,

heating said funnel to fuse said soldering alloy to said funnel, said soldering alloy filling said apex end and completely closing said opening while being retained in said funnel by capillary effect,

allowing said funnel to cool until said soldering alloy has solidified;

placing the leads adjacent the components so that the apex ends of the funnels are applied to the surface of the components at desired locations and

heating the funnels sufficiently to cause fusion and capillary flow of the soldering alloy at said surface thereby soldering said leads to said resonator with the soldering alloy from said funnel.

4,089,093

METHOD OF MANUFACTURING A VARIABLE CAPACITOR

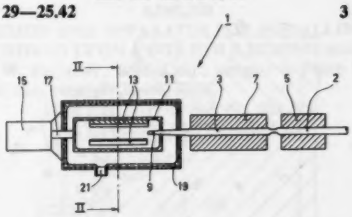
Jan Lefeber, Tilburg, and Jelis de Jonge, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 17, 1975, Ser. No. 623,552

Claims priority, application Netherlands, Oct. 22, 1974, 7413794

Int. Cl.[2] H01G *5/06*

U.S. Cl. 29—25.42 **3 Claims**



1. A method of making a variable capacitor which comprises providing a plurality of metal rotor plates each having an aperture, thereafter vapor depositing a film of polyparaxylylene on each rotor plate in a tumbling operation so that no metal of the rotor plates remains exposed, press fitting each coated rotor plate on a metal shaft to thereby remove at least a portion of the polyparaxylylene film from the plate aperture

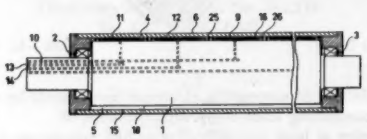
and provide good electrical contact between the rotor plates and the shaft, adjacent rotor plates being spaced from each other, and assembling the resulting stack of rotor plates in capacitive relationship with a stack of correspondingly spaced metal stator plates.

4,089,094

PRESS ROLL WITH CONTROLLABLE DEFLECTION

Lauri Olavi Kaira, Kuusankoski, Finland, assignor to Valmet Oy, Finland

Filed Dec. 10, 1976, Ser. No. 749,522
Claims priority, application Finland, Jun. 11, 1976, 761696
Int. Cl.² B21B *13/02*
U.S. Cl. 29—116 AD **17 Claims**



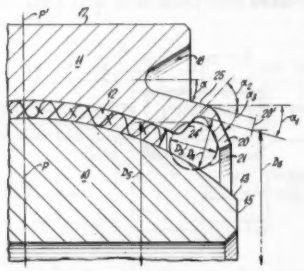
1. A press roll for treating a sheet material such as paper and suitable for use in a calender or press section of a paper machine, comprising an elongated stationary solid shaft, a cylindrical shell coaxially surrounding said shaft, said shaft and shell having a common axis and respectively having outer and inner surfaces spaced from each other to define a cylindrical gap between said shaft and shell, bearing means supporting said shell for free rotary movement about said common axis of said shaft and shell, a plurality of endless sealing means situated closely adjacent each other in and distributed in a row longitudinally along said gap parallel to said axis for defining between said shaft and shell a row of pressure zones respectively surrounded by said sealing means, and a plurality of duct means communicating with said pressure zones and extending therefrom along the interior of said shaft for conveying fluid under pressure to said pressure zones, so that by individually controlling the pressure of the fluid conveyed respectively to said pressure zones the operation of said shell with respect to sheet material engaging the same can be controlled.

4,089,095

SEAL MEANS FOR A SELF-ALIGNING BEARING AND METHOD OF MAKING THE SAME

Manfred E. Becker, Newington, Conn., assignor to Textron Inc., Providence, R.I.

Filed Jan. 11, 1977, Ser. No. 758,402
Int. Cl.² B21D *53/10*
U.S. Cl. 29—149.5 B **16 Claims**



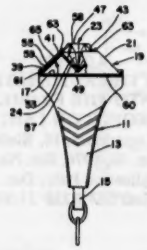
16. The method of making a seal for a bearing wherein the concave inner surface of an outer-ring member has self-alignment fit to the spherical convex outer surface of an inner-ring member, which method comprises selecting an annulus of deformable material and forming the same with a concave spherical surface for self-aligning circumferentially extensive sliding fit to the convex spherical surface of the inner-ring member, machining the thus-formed annulus, such machining including the formation of a relatively thin circumferentially continuous axially projecting lip at a counterbore which extends axially inwardly substantially to the adjacent axial limit of the concave-to-convex bearing interface, said lip also being in circumferentially continuous radially offset clearance with respect to said convex spherical surface, selecting and fitting an elastomeric ring between the lip and the inner ring at said clearance, and deforming the lip axially and radially inwardly into retaining engagement with the ring.

4,089,096

METHOD OF MAKING SCHOOL RING TOP

John Graham Michael, 431 Parkview Dr., Wynnewood, Pa. 19096

Filed Aug. 13, 1976, Ser. No. 714,090
Int. Cl.² B23P *13/00*
U.S. Cl. 29—160.6 **13 Claims**



1. A method of making a multiplicity of substantially identical ring tops for school jewelry such as school rings, keys, and charms, comprising the steps of

photographing artwork on a series of film frames having sprocket holes so that the artwork on each frame is registered with respect to the sprocket holes,

developing the film to obtain a roll or developed photographic film frames with intelligence and background thereon with a portion of said film being transparent,

affixing a reflecting backing to the back of said film frames to form reflective film frames that reflect light through said transparent portion of the film,

forming beveled bezels from said reflective film frames,

and supporting said bezels by attaching them to support means.

4,089,097

METHOD OF FORMING AN ANNULAR SLOT IN A LONGITUDINALLY SPLINED ANNULAR MEMBER

William K. Good, Pontiac, and Wilson J. Harbage, Birmingham, both of Mich., assignors to Koppy Corporation, Ferndale, Mich.

Division of Ser. No. 617,814, Sep. 29, 1975, Pat. No. 4,014,619.
This application Nov. 17, 1976, Ser. No. 742,669
Int. Cl.² B23P *15/16*
U.S. Cl. 29—163.5 R **6 Claims**

1. A method of forming an annular slot in a longitudinally splined annular member to receive a snap-type retaining ring therein; said method comprising lancing the root section of each spline of said splined member along two spaced lines and further comprising the step of displacing the material between said lanced portions radially away from said root section.

4. A method of forming an annular slot in a longitudinally splined annular sheet metal member; said method comprising

lancing the root section of each spline of said splined member along two spaced lines and further comprising the step of

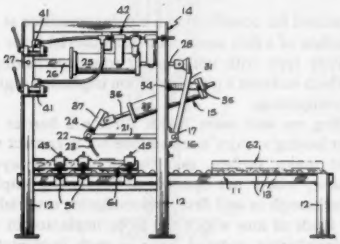
displacing the material between said lanced portions radially away from said root section.

4,089,098

PRYING MACHINE FOR DISMANTLING PALLETS AND THE LIKE

Charles C. DeMarco, 10572 Beardsley Cir., Villa Park, Calif. 92667

Filed Mar. 11, 1977, Ser. No. 776,643
Int. Cl.² B23P *19/00*
U.S. Cl. 29—239 **8 Claims**



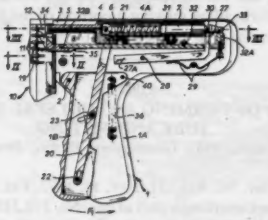
1. A machine for dismantling wooden pallets having spaced cross-members fastened to a plurality of stringers, comprising:
an unyielding bed;
a rigid superstructure mounted to said bed;
laterally spaced pry plates mounted to said superstructure transversely of said bed for insertion between adjacent pairs of said cross-members in a pallet positioned on said bed, said pry plates being moveable normally of said bed and rotatable about an imaginery axis spaced from and substantially parallel with said bed;
at least one rigid hold-down beam secured to said bed and spaced therefrom for passage of said pallet between said beam and said bed; and
controllable powered means operatively connected between said superstructure and said pry plates for so moving and rotating said plates, and thereby sequentially inserting said pry plates between said adjacent pairs of cross-members and urging said pry plates against one of said pair of cross-members in a direction away from said bed.

4,089,099

AUTOMATIC TOOL FOR SETTING RIVETS OR LIKE FASTENERS SUPPLIED IN STRIP FORM

André Nivet, Beauchamp, France, assignor to ITW de France, S.A., Beauchamp, France

Filed Jul. 1, 1977, Ser. No. 812,200
Claims priority, application France, Jul. 30, 1976, 76 23505
Int. Cl.² B23P *11/00*
U.S. Cl. 29—243.53 **5 Claims**



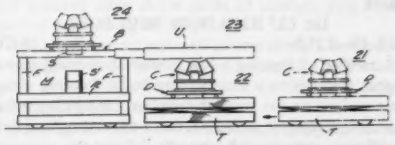
1. An automatic portable tool for setting and fixing rivets or like fasteners of the expansion type supplied in strip form, inside assembly holes, comprising:
a magazine formed by a slideway for receiving a strip of rivets; an outlet orifice having supporting rocking cams disposed therein; and means for advancing the strip of rivets stepwise whereby to fetch the leading rivet between said supporting rocking cams in the outlet orifice;
a breech movable longitudinally along the axis of said magazine outlet orifice and provided at its front end with a barrel, said barrel being capable of engaging with the rivet mandrel and with the rivet head whereby to fetch the rivet, after its attachment means to the next rivet have been cut and said supporting rocking arms have retracted, into a presentation position wherein it stands well proud of the magazine and can be set visually;
a striker slidable along the axis of said breech and having a front striker pin, said pin being capable of striking the rivet mandrel through said barrel whereby to drive it into the body of the rivet and cause the same to be secured by expansion inside the assembly hole;
and a double-acting detent and trigger actuating mechanism so devised that, responsively to an initial pressure on the detent, it causes said breech to advance and to be locked in a configuration wherein said barrel projects in a position of external presentation of the rivet to be set and, responsively to a second pressure on the detent, it triggers operation of said striker.

4,089,100

METHOD AND APPARATUS FOR INSTALLING A CUTTERHEAD UPON A BOX HOLE BORING MACHINE

Robert W. Berry, Jr., Brea, Calif., assignor to Smith International, Inc., Newport Beach, Calif.

Filed Aug. 7, 1975, Ser. No. 602,775
Int. Cl.² B23P *19/04;* B60P *1/02*
U.S. Cl. 29—428 **8 Claims**



1. The method of installing a cutterhead upon a box hole boring machine located within a horizontal drift of a mine comprising the steps of:

locating the cutterhead upon a movable transport means;
moving the transport means to a location within a predetermined distance from the boring machine;
positioning a rail bridge to extend from the transport means to an upper surface of the boring machine;
moving the cutterhead from the transport means, across the rail bridge, to a position above the boring machine so that the machine supports the entire weight of the cutterhead; and
removing the cutterhead from the rail bridge by elevating the cutterhead by moving a portion of the boring machine between the rails of the rail bridge.

4,089,101

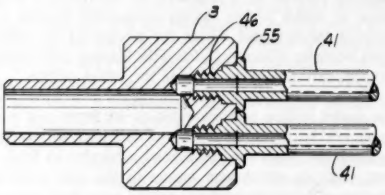
METHOD OF FORMING A FLUID SEAL BETWEEN A TUBE AND FITTING

Albert J. Balon, 9717 Greenhaven Pkwy., Brecksville, Ohio 44136

Division of Ser. No. 415,551, Nov. 14, 1973, Pat. No. 3,940,168, which is a continuation-in-part of Ser. No. 378,318, Jul. 11, 1973, Pat. No. 3,942,825. This application Nov. 29, 1974, Ser. No. 528,160

Int. Cl.[2] B21D *39/00*; B23P *11/02*

U.S. Cl. 29—523 **5 Claims**



1. A process for forming a fluid seal between a tube means having an end and a wall, and a fitting means having an external surface, said process comprising the steps of forming a bore in said fitting means, said bore having an internal wall, an opening in said external surface and internal threads in said internal wall and spaced from said opening; threading said wall of said tube means externally, adjacent said end and complementary to said bore threads; threadably engaging said tube means threads and bore threads; and exerting an axial force on said tube means to upset and flow said wall of said tube means into sealing engagement with said internal wall of said bore and into forming an integral, external flange on said tube means wall in sealing engagement with said external surface of said fitting means surrounding said bore opening.

4,089,102

METHOD OF FORMING AND USING A LENS HOLDER

Peter Henry Hunt Soper, Rugby; Michael John Meehan, Crick, and John Reginald Rouse, Rugby, all of England, assignors to Autoflow Engineering Limited, England

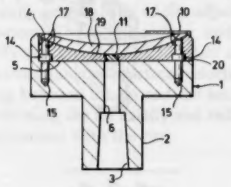
Filed May 26, 1976, Ser. No. 690,367

Claims priority, application United Kingdom, Oct. 23, 1975, 43609/75

Int. Cl.[2] B22D *19/06*; B24B *13/00*

U.S. Cl. 29—527.5 **19 Claims**

1. A method of forming a lens holder comprising mounting a support member on a lens-holding body, forming a curved contact surface on the support member, positioning a former on the curved contact surface so that a curved surface defined by the former seats on and generally follows the curvature of said curved contact surface, introducing a settable mass of flowable material into a cavity defined between said curved surface and the lens-holding body, and removing the former from the curved contact surface after the material has set whereby the set material and curved contact surface together define a permanent lens-supporting surface for a lens having a



curved surface substantially corresponding to the curved surface of the former.

4,089,103

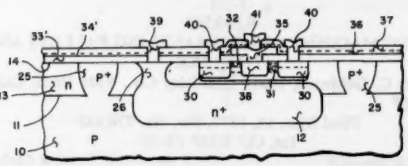
MONOLITHIC INTEGRATED CIRCUIT DEVICE CONSTRUCTION METHODS

Thomas E. Hendrickson, Minneapolis; Jack S. T. Huang, New Hope, and Wolfgang Tetzlaff, Hopkins, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 4, 1976, Ser. No. 693,049

Int. Cl.[2] B01J *17/00*

U.S. Cl. 29—577 C **52 Claims**



1. A method for constructing a bipolar transistor at an outer major surface of a first semiconductor material layer of a first conductivity type with said bipolar transistor having a base region which includes a plurality of ion implanted regions, said method comprising:
providing on said outer major surface a barrier masking layer having a major mask surface not in contact with said outer major surface, said barrier masking layer being capable, where not opened, of preventing implantation therethrough in said first semiconductor material layer of any kinds of ions which are to be implanted in said first semiconductor material layer in each implantation step following in said method in which said barrier masking layer is present;
providing, above a location in said first semiconductor material layer where said base region is desired to be located, a first ion implantation opening in said barrier masking layer extending partially therethrough from said major mask surface with a scattering layer, having a scattering layer surface, provided between said first ion implantation and said outer major surface such that said scattering layer surface serves as a termination to said first ion implantation opening, to thereby provide a masked structure, said scattering layer capable of permitting ion implantation therethrough in said first semiconductor material layer in at least one ion implantation step following in said method in which said scattering layer is present;
implanting at least ions of a first kind in said first semiconductor material layer, in a plurality of ion implantation steps, including a first implantation, by impinging a kind ions in each said implantation step on said masked structure, including impinging them through said first ion implantation opening, to thereby form a plurality of re-

gions, including a first region of a second conductivity type, in said first semiconductor material layer;

providing on said outer major surface in place of said barrier masking layer an interconnection support layer having an exposed major support surface not in contact with said outer major surface to thereby provide a protected structure, where said interconnection support layer is capable of permitting at least one kind of ions to be implanted therethrough in said first semiconductor material layer at any location under said interconnection support layer through a repetition of at least one aforesaid implantation step occurring in said method;

providing an electrical contact opening in said interconnection support layer from said major support surface; and

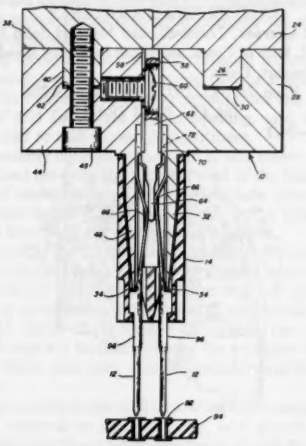
providing a device electrical interconnection system on said major support surface which makes electrical contact with said first semiconductor material layer at said outer major surface through said electrical contact opening.

4,089,104

METHOD AND APPARATUS FOR PREASSEMBLING A PRINTED CIRCUIT BOARD CONNECTOR

Richard Francis Barry, Southington; Charles Angus Gourley, Bethel, and Dennis George Kohanek, Southbury, all of Conn., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Filed May 3, 1977, Ser. No. 793,300
Int. Cl.[2] H05K *3/32;* B23P *19/02*
U.S. Cl. 29—626 **11 Claims**



1. A method for preassembling an electrical connector for mounting upon a printed circuit board, comprising the steps of:

loading a plurality of contacts into a preassembly tool to form at least one row of aligned contacts;

placing an insulator housing upon said preassembly tool about said plurality of aligned contacts to preassemble said connector; and

pushing said preassembly tool down against said printed circuit board for placing the said preassembled connector upon said board by inserting said aligned contacts into apertures in said board wherein said contacts hold said insulator housing against said board.

5. Apparatus for preassembling an electrical connector for mounting upon a printed circuit board having apertures therein, comprising:

means for retaining a plurality of contacts in at least one aligned row;

means for retaining an insulator housing in a preassembled connector configuration about said row of aligned contacts on said means for retaining said contacts; and

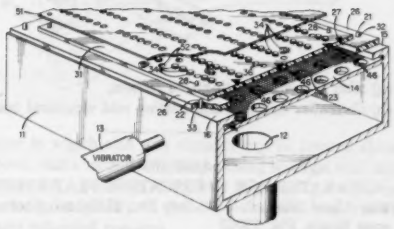
means for inserting said contacts in said preassembled connector into at least one aligned row of said apertures in said printed circuit board for completing the assembly of said pressembled connector.

4,089,105

METHOD FOR MOUNTING LEAD SOCKETS TO AN ELECTRICAL INTERCONNECTION BOARD

Herbert G. Yeo, Lincoln, and John Nelson, North Kingstown, both of R.I., assignors to Augat Inc., Attleboro, Mass.

Filed Nov. 22, 1976, Ser. No. 744,135
Int. Cl.[2] H05K *3/30*
U.S. Cl. 29—626 **12 Claims**



1. A method for inserting lead sockets directly into holes in an electrical interconnection panel board, said lead sockets having a socket opening at one end and a plurality of flexible converging fingers at the other end, said method comprising the steps of:

creating a flow of air downwardly through the holes in said panel board;

placing a multiplicity of said lead sockets on the top of said panel board;

vibrating said panel board, whereby upon the combined action of said air flow and vibration, said lead sockets are distributed over the top surface of said panel board and some of said lead sockets are seated in the holes therein, said lead sockets having a major diameter greater than the diameter of said holes in said panel board to provide an interference fit in said holes;

placing said panel board in a hydraulic press; and

applying a force by means of a platen having a surface dimension substantially the same as the top surface of said panel board to the tops of said lead sockets to simultaneously seat all of said lead sockets flush with the top surface of said panel board.

4,089,106

METHOD FOR PRODUCING ELECTRICAL CONTACTS

Jack Seidler, New York, N.Y., assignor to North American Specialties Corp., Flushing, N.Y.

Division of Ser. No. 530,518, Dec. 9, 1974, Pat. No. 3,987,264, which is a continuation-in-part of Ser. No. 363,947, May 25, 1973, abandoned. This application May 21, 1976, Ser. No. 688,542
Int. Cl.[2] H01R *43/02*
U.S. Cl. 29—630 C **2 Claims**

1. A method for producing electrical contacts with a bonded contact material inlay at the point of contact with a mating component comprising the steps of:

(a) supplying contact material ribbon along a first path;

(b) supplying unformed support material along a second path, substantially perpendicular to said first path and intersecting said first path;

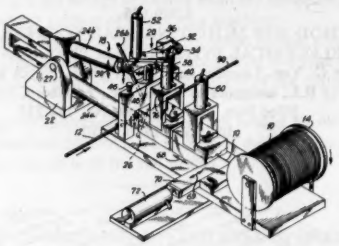
(c) gripping said ribbon with a primary gripping device;

(d) moving said ribbon along said first path to said intersection by moving said primary gripping device;

(e) gripping said ribbon with a secondary gripping device;

(f) substantially simultaneously welding said ribbon to said support material and substantially concurrently releasing said

primary gripping device while moving said primary gripping device to its original position;



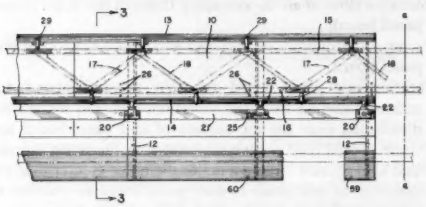
(g) after welding, cutting said ribbon;
(h) thereafter forming and cutting said electrical contact.

4,089,107

APPARATUS FOR FABRICATING FLAT TRUSSES

Arthur Carol Sanford, 2308 Bay Dr., Hillsboro Shores, Pompano Beach, Fla. 33062

Filed Mar. 14, 1977, Ser. No. 777,173
Int. Cl.[2] B23P *11/00*
U.S. Cl. 29—798 **8 Claims**



1. Apparatus for fabricating flat wood trusses having parallel chords and web components joined to the chords by toothed metal plates, comprising a rigid elongated truss assembly bed, a fixed pressure bar extending along and mounted on one side of said bed, a laterally movable pressure bar extending along the opposite side portion of said bed, a support bar laterally adjacent to and substantially coextensive with said pressure bar, fluid pressure means on said support bar connected to said pressure bar for clamping a truss assembled on the bed between the movable pressure bar and the opposing fixed pressure bar, said support bar being laterally adjustably mountable on said bed at a series of positions, whereby the fluid pressure means and the movable pressure bar carried thereby are selectively located for clamping various heights of trusses, and a stationary stand of pinch rolls at one end of said bed through which a truss assembled on the bed may be passed to embed the teeth of the joining plates into the wood.

4,089,108

FILTER SLEEVE STUFFING MACHINE

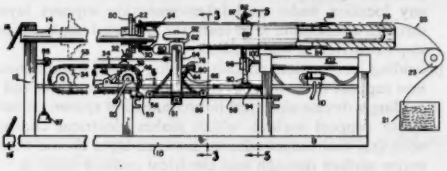
Richard C. Overmyer, Francesville, and Mario Guerra, Zionsville, both of Ind., assignors to Francesville Drain Tile Corporation, Francesville, Ind.

Filed Feb. 3, 1977, Ser. No. 765,249
Int. Cl.[2] A22C *13/00*
U.S. Cl. 29—820 **15 Claims**

1. Apparatus for gathering and packing a length of filter sleeve material or the like on a cartridge tube and against a stop at one end thereof, comprising

means to support the cartridge to receive a length of sleeve material over one end and along its length toward its stop end thereof and to resist axial thrust toward its stop end,

a plurality of gathering wheels spaced circumferentially about the cartridge for engaging the sleeve thereon and



means to drive the wheels to gather the sleeve material toward the stop end of the cartridge,

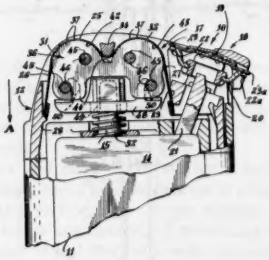
and packer means for engaging the gathered sleeve material and exerting thrust thereon toward the stop end of the cartridge to pack the gathered material on the cartridge, said packer means being movable along the cartridge tube toward the wheels, and said wheels being retractable to clear the path of the packer means.

4,089,109

CUTTER HEAD ASSEMBLY

Peter Alfred Czerner, Trumbull, and Michael John Marchetti, Bridgeport, both of Conn., assignors to Sperry Rand Corporation, Bridgeport, Conn.

Filed Jan. 17, 1977, Ser. No. 759,936
Int. Cl.[2] B26B *19/06*
U.S. Cl. 30—34.1 **8 Claims**



1. A cutter assembly for an electric shaver comprising;

a. a flexible foil outer cutter formed into parallel rows of arcuate-shaped outer cutters,

b. an inner cutter assembly providing parallel rows of arcuate-shaped cutting surfaces,

c. means for supporting said rows of cutting surfaces in engagement with said rows of outer cutters,

d. said inner cutter assembly including a plurality of individual H-shaped cutter blades comprising a one-piece construction having an intermediate segment spacing opposed blade segments,

e. said blade segments including a cutter portion formed with said arcuate-shaped cutting surfaces on the periphery thereof and a support portion having means formed therein for joining said plurality of individual cutter blades in said rows of parallel arcuate-shaped cutting surfaces, and

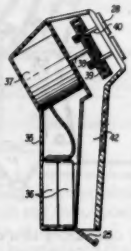
f. means positioned between said blade segments adjacent said intermediate segment for operating said inner cutter assembly in hair shearing relationship with said foil outer cutter.

4,089,110

SHAVING MEANS

Darius K. Rasco, Rte. 5, Box 244, Mobile, Ala. 36608

Filed Mar. 8, 1976, Ser. No. 665,130
Int. Cl.[2] B26B *19/44, 19/16*
U.S. Cl. 30—41.5 **12 Claims**



1. A power shaver for shaving whiskers from the skin comprising

a housing having first and second compartments therein, said second compartment being used for whisker storage and having a plurality of apertures in the forward wall thereof directed during operation of said shaver toward the skin being shaved,

motor means located within said first compartment, the shaft of said motor means projecting through the wall of said first compartment,

a shaving head attached to said housing including a face plate having at least one opening therein and at least one rotatable cutter blade positioned adjacent the inside surface of said face plate at said opening, said head being connected to said second compartment,

a gear assembly coupled to the shaft of said motor means and interposed between the forward wall of the first compartment of said housing and the cutter blade of said shaving head, said motor means rotating said cutter blade relative to said face plate for cutting said whiskers,

a fan secured to the shaft of said motor means for drawing air in through the opening in said face plate, into said second compartment for whisker storage and out through the plurality of apertures in the forward wall of said compartment to direct the expelled air against the skin being shaved, said fan further drawing the whiskers cut by said cutter blade into said second compartment for storage therein,

a releasable cover in the wall of said second compartment to permit removal of said whiskers, said second compartment being air flushable by operation of said fan with said cover removed thereby expediting removal of whiskers from within said second compartment.

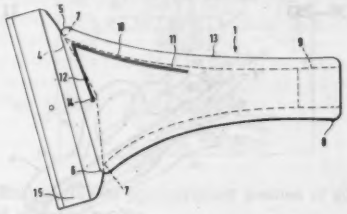
4,089,111

UTILITY TOOL

Heinrich Karpp, Fahrenberg 19 A, 4300 Essen, Germany

Filed Nov. 24, 1976, Ser. No. 744,605
Claims priority, application Germany, Nov. 26, 1975, 2553013
Int. Cl.[2] B26B *1/00*
U.S. Cl. 30—154 **18 Claims**

1. A utility tool, such as a scraper, trimmer, cutter and the like, comprising a tool element having a working edge portion; an elongated handle element having a front and a rear end and a longitudinal marginal portion extending between said ends of said handle element, and bounding a cavity which has a mouth at said front end and such dimensions as to fully accommodate said tool element; and means for mounting said tool element on said handle element for movement between an extended position in which said working edge portion assumes a working position outside said handle element, and a retracted storage position in which said tool element is received in said cavity, said mounting means including a cam track on said handle element and a follower on said tool element and engaging said cam track to guide said tool element for said movement between said positions thereof, said cam track having a first section extending along said front end and operative for guiding said tool element between said extended and an intermediate position in which said tool element can be rotated about said follower, and a second section enclosing an angle with said first section and extending along said marginal portion and operative for guiding said tool element between said intermediate and said retracted position.

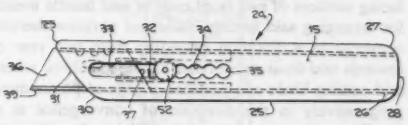


4,089,112

ADJUSTABLE BLADE KNIFE

James L. Richards, Rosemead, Calif., assignor to Pacific Handy Cutter, Inc., Costa Mesa, Calif.

Filed Sep. 30, 1976, Ser. No. 728,300
Int. Cl.[2] B26B *1/08*
U.S. Cl. 30—162 **1 Claim**



1. An adjustable blade knife comprising:

a one piece handle having a continuous longitudinally extending recess forming a web portion between marginal edge portions of thicker dimension then that of said web:

a pair of opposed slots formed in said handle along opposite sides of said recess in said edge portions with each slot having a side wall adjacent and coplanar to a side wall of said web;

an assembly of slide plate and cutting blade in side-by-side interconnected relation and positioned in said recess with marginal portions of said plate and blade assembly extending into each of said slots, respectively, and being guided along said handle thereby; and

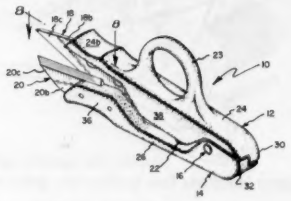
positioning means comprising a slot formed in said web of said handle, said slot comprising a continuous slot having a first rectangular portion connected to a second portion comprising a plurality of overlapping and interconnected circular slot portions. a spring arm formed integrally of said slide plate, cam means on said arm for fitting said circular slot portions, and a manually operable member operable from the side of said handle opposite said slots and connected to said arm for selectably depressing said arm away from the handle side having said slots out of engagement with said slot portions to adjust the position of said slide and blade assembly relative to said handle.

4,089,113

THREAD SNIP

Lyle E. Moritz, and John L. Fortuin, both of Springville, N.Y., assignors to Robinson Knife Manufacturing Co., Inc., Springville, N.Y.

Filed Aug. 8, 1977, Ser. No. 822,395
Int. Cl.[2] B26B *13/04*
U.S. Cl. 30—253 **11 Claims**



1. A manually operable cutting device including in combination:

a pair of elongated, operator manipulated handle members formed of a resiliently deformable material and having front and rear ends;

a hinge means for coupling said rear ends of said handle members to permit pivotal movements of said handle members about an axis, said handle members having integrally formed bearing surfaces disposed essentially normal to said axis and arranged in engagement for preventing disassembling movement of said handle members in opposite directions aligned with said axis and integrally formed stop means engageable for limiting said pivotal movements to define open and closed positions of said handle members;

a pair of cutting blades bent intermediate their ends to define mounting and cutting blade end portions arranged at an angle one portion to another, said cutting blades having said mounting end portion thereof fixed one to each of facing surfaces of said front ends of said handle members for arranging said cutting blade end portions thereof to converge in a direction extending from said rear ends towards said front ends of said handle members, whereby said cutting blade end portions engage at points moving progressively in the direction of convergence as said handle members pivot towards said closed position; and

resiliently deformable means tending to bias said handle members for movement into said open position.

4,089,114

CUTTING DEVICE

Stephen Dale Doolittle, Rock Hill, S.C.; Lynn David Lineback, Danville, Va.; Charles Franklin Sherrill, Danville, Va.; Willie Lonnie Stanfield, Jr., Danville, Va., and Kelvin Howard Wildman, Danville, Va., assignors to Disston, Inc., Pittsburgh, Pa.

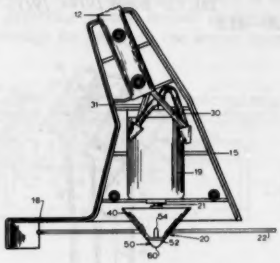
Continuation-in-part of Ser. No. 719,340, Aug. 31, 1976, abandoned. This application Jun. 2, 1977, Ser. No. 802,956
Int. Cl.[2] A01D *35/26*; A01G *3/06*
U.S. Cl. 30—276 **6 Claims**

1. A tip member for mounting on a rotary member of a strand type cutting device, comprising:

(a) a length of flexible strand;

(b) a top strand retainer including finger means for detachable securement to said rotary member by outwardly pressing snap-fit engagement of said finger means with mating slot receiving portions on said rotary member; and

(c) a bottom strand retainer secured to said top retainer at an interface, said top and bottom retainers having cooperative means at such interface for fixedly holding the midpoint of such strand with the free end portions thereof



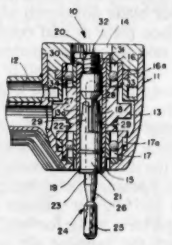
projecting radially outwardly in a cutting plane substantially normal to the axis of said rotary member.

4,089,115

SPRING GRIP CHUCK ASSEMBLY FOR DENTAL HANDPIECES

Donald J. Heil, Lake Villa, and Boubene M. Jaremus, Barrington, both of Ill., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Nov. 17, 1976, Ser. No. 742,551
Int. Cl.[2] A61C *1/10*
U.S. Cl. 32—27 **13 Claims**



1. An improved dental handpiece of the type having a rotor housing with a chamber and with upper and lower openings coaxial therewith, a rotor within said chamber having a bore aligned with said openings, and a tubular chuck received in said bore, wherein the improvement comprises said chuck being fixed to said rotor within said bore and having a plurality of upwardly projecting circumferentially spaced spring jaws, said jaws normally sloping upwardly and inwardly into partially closed positions for firmly gripping a dental bur therebetween and being capable of being flexed outwardly into open positions for releasing such bur, and control means provided at the upper end of said bore and accessible through said upper opening in said housing for engaging said jaws and flexing same into said open positions.

4,089,116

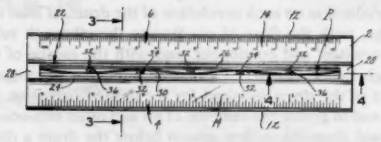
PAPER HOLDER

Wells Stone Bearinger, St. Ann, Mo., assignor to Quick Point Pencil Co., Inc., Fenton, Mo.

Filed Sep. 3, 1976, Ser. No. 720,142
Int. Cl.[2] G01B *3/04*; G09F *3/18*
U.S. Cl. 33—107 R **10 Claims**

1. A holder for supporting a piece of paper or other thin flexible sheet material in an upright position, said holder comprising: a base capable of resting in a stable condition on a horizontal surface; and a paper retainer projecting upwardly

from the base and including a pair of spaced apart side walls which define an upwardly opening slot with means for joining the sidewalls at the bottom of the slot and further including a plurality of generally vertical ribs on each of the walls with the ribs on the one wall being offset and alternated with respect to the ribs on the other wall, each rib projecting generally perpendicularly away from the bottom of the slot and also extending into the slot beyond the center plane for the slot with the spacing between each rib and the opposite wall being greater at the top of the slot than at the bottom of the slot, whereby a piece of paper is easily inserted into the slot and as it is moved downwardly will acquire a plurality of vertically directed corrugations so as to remain in an upright disposition in spite of being quite limber.

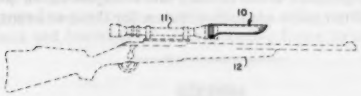


4,089,117

SUNSHADE FOR TELESCOPIC SIGHTS

Rudy G. Villarreal, 10815 Pinehill St., San Antonio, Tex. 78230

Filed Sep. 7, 1976, Ser. No. 721,049
Int. Cl.² F41G *1/00*; G03B *11/04*
U.S. Cl. 33—244 **3 Claims**



1. A sunshade for a telescopic sight comprising:
a. an elongated flexible resilient plastic body having a first end and a second end having,
b. a scope grasping collar having an inner surface and an outer surface secured to said first end, said scope grasping collar possessing sufficient flexibility and resiliency to be retained on a telescopic sight during the firing and recoil of a rifle, said scope grasping collar further comprising:
(1) a serrated inner surface constructed in the inner surface of said scope grasping collar,
(2) flexing slots constructed in said outer surface of said scope grasping collar, and
(3) a flexing bead constructed at the bottom edge of said scope grasping collar to facilitate mounting and demounting on a telescopic sight,
c. said elongated flexible resilient plastic body projecting to the said second end,
d. a wide, elongated viewing slot constructed in said elongated flexible resilient plastic body extending from said second end to the area adjacent said scope grasping collar.

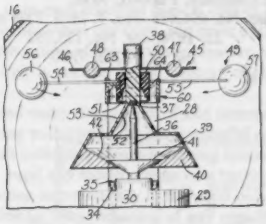
4,089,118

COURSE INDICATOR

Bernard Howard, 73 McKinley Ave., New Haven, Conn. 06515

Continuation-in-part of Ser. No. 536,208, Dec. 24, 1974, abandoned, which is a continuation-in-part of Ser. No. 407,613, Oct. 18, 1973, abandoned. This application Jun. 14, 1976, Ser. No. 695,832
Int. Cl.² G01C *17/14*
U.S. Cl. 33—349 **43 Claims**

1. A course indicating device comprising a compass adapted to rotate to a predetermined magnetic position, a shaft mounted to rotate with said compass, a reference marker, an indicator normally rotatable in fixed position with said shaft but rotatably positionable with respect thereto, means for moving said shaft axially, and guide means responsive to axial movement of said shaft for rotating said indicator with respect to said shaft and into a predetermined position of alignment with said reference marker.

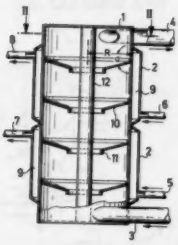


4,089,119

PROCESS AND DEVICE FOR THE THERMAL TREATMENT OF A MIXTURE OF FINELY DIVIDED SOLIDS AND GASES

Christoph Heinze, Burghausen, Salzach, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jul. 1, 1975, Ser. No. 592,115
Claims priority, application Germany, Jul. 6, 1974, 2432627
Int. Cl.² F26B *3/10*
U.S. Cl. 34—10 **10 Claims**



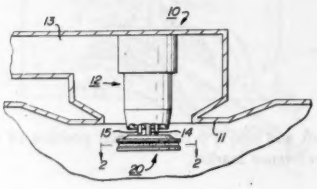
1. In a process for thermally treating a mixture of finely divided solids and gases by feeding a stream of gas having a speed of about 1 to about 100 meters per second tangentially into a cylindrical vessel, adding the solid to the gas at the latest in the vessel, adjusting the temperature of the mixture of solid and gas in the vessel through the wall thereof, conducting the stream of gas-solid mixture in the vessel in at least two annular flow paths having the same sense of rotation substantially closed in themselves, situated in horizontal position one above the other, the improvement comprising transporting only part of the mixture flowing in one annular flow path to the above adjacent annular flow path by restricting the flow area to a concentric inner zone between the annular flows having about 15–40% of the flow area in the annular flow paths, whereby the time that the mixture flows in the annular flow path is prolonged to thus prolong the thermal treatment of the mixture and improve its classification, conducting the stream of the mixture of gas and solid in opposite direction to the gravitation to the top of the vessel and discharging at the top of the vessel in the same sense of rotation as the gas fed into the vessel at the bottom.

4,089,120

PRODUCTION OF MACROSPHERICAL PARTICLES FOR ANTI-PERSPIRANTS AND THE LIKE

James F. Kozischek, Belvidere, N.J., assignor to Armour Pharmaceutical Company, Phoenix, Ariz.

Division of Ser. No. 694,419, Jun. 9, 1976. This application Sep. 23, 1976, Ser. No. 725,752
Int. Cl.[2] F26B 7/00
U.S. Cl. 34—12 11 Claims



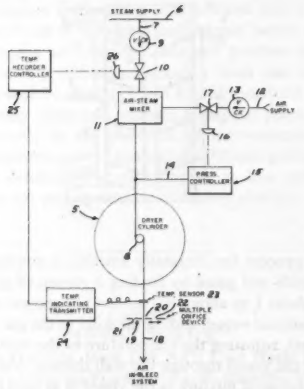
1. A process for producing hollow macrospherical particles comprising providing a solution containing the material from which said particles are made, diffusing said solution through small pores by centrifugal force, said pores having a nominal diameter smaller than that of the desired particles, drying the diffused solution in a stream of heated air after it leaves said pores such that particles are produced having a diameter predominantly between about 10 to 74 microns.

4,089,121

METHOD AND APPARATUS FOR CONTROLLING A WET END DRUM OF A STEAM HEATED DRUM DRYER

Willard C. Sawyer, Oxford, Me., assignor to Gorham International Inc., Gorham, Me.

Filed Jul. 12, 1976, Ser. No. 704,428
Int. Cl.[2] F26B 3/24
U.S. Cl. 34—16 4 Claims



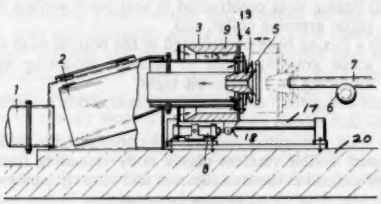
1. Apparatus for maintaining a substantially constant control of the temperature of the interior of a drum of a steam heated drum dryer, said apparatus including a flow path through the drum, means operable to introduce a homogenous mixture of steam and air into the infeed portion of said path to maintain the internal drum temperature against any material fluctuation due to the difference in steam and air temperatures, said means including a temperature control for the steam and a pressure control for the air, the outfeed portion of the path dimensioned to accommodate the maximum possible volume under the pressure within the drum of a combination of condensate, air and steam to ensure the discharge of the combination from the drum at the maximum possible rate of condensate production, the proportions of condensate and steam in the combination varying during each revolution of the drum, said outfeed portion including a drop leg section, a control including an orifice of predetermined size in said drop leg section dimensioned to provide a pressure drop effective to ensure that the temperature and pressure of the fluids exteriorly of the drum and above the orifice are substantially those existing interiorly of the drum and to permit the passage therethrough of the entire volume of said combination at a predetermined rate of condensate production on each revolution of the drum, at least on the average, with the flow of condensate therethrough substantially constant and continuous, and with the escape of blow-through steam reduced to a desired minimum percentage by weight of the steam required for the desired operation of the drum and to ensure the removal of air and other non-condensibles, said drop leg section spaced below the drum a distance such that condensate can accumulate outside the drum and directly above the orifice as the percentage of condensate in the flowing combination increases above a predetermined percentage during each revolution of the drum whereby said orifice functions to maintain the temperature and pressure of the fluids in the drop leg section and above the orifice substantially equal to that of the interior of the drum by virtue of the assurance that the pressure drop in the case of the fluids of the combination occurs at the orifice and as a separator by virtue of the accumulated condensate substantially but not completely blocking passage of steam, second means including a stationary sensor above the orifice and operable continuously to monitor the temperature of the fluids in the drop leg section above the orifice and to adjust the steam control and cooperating with said first means to establish a substantially constant desired drum temperature and means continuously operable to monitor the pressure of the mixture and to adjust the air pressure control to ensure adequate pressure for the evacuation of the drum.

4,089,122

NOISE ATTENUATION DURING STEAM BLOWING OF COATED TUBES

Karl Gust, Mettmann; Albert Hankel, Kettwig; Horst Hasenclever, Oberhausen, and Eberhard Titze, Ratingen, all of Germany, assignors to Mannesmannrohren-Werke AG., Dusseldorf, Germany

Filed Sep. 16, 1975, Ser. No. 613,848
Claims priority, application Germany, Sep. 17, 1974, 2444944
Int. Cl.[2] F26B 21/06
U.S. Cl. 34—79 15 Claims



1. In a device for blowing plated tubes by means of steam for purposes of cleaning the interior of such a tube from residue of th plating material, comprising:

first means defining a noise attentuation chamber with entrance to be placed in engagement with one end of the tube through which the blown steam discharges;

second means defining an expansion chamber disposed in relation to the noise attenuation chamber to receive therefrom the steam for collecting larger particles in the steam; and

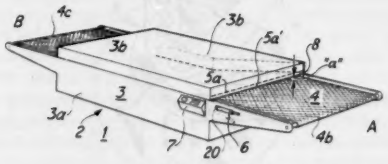
filter means connected to the means defining an expansion chamber to clean said steam.

4,089,123

APPARATUS FOR DRYING INK ON FRESHLY PRINTED MATERIAL

Sylve Jack Donald Ericsson, Tumba, and Karl Georg Larsson, Norsborg, both of Sweden, assignors to Svecia Silkscreen Maskiner AB, Sweden

Filed May 3, 1976, Ser. No. 682,637
Claims priority, application Sweden, May 13, 1975, 7505456
Int. Cl.[2] F26B *13/00*
U.S. Cl. 34—155 6 Claims



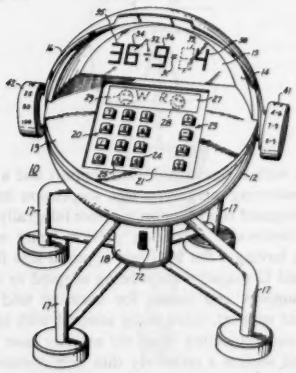
1. An ink-drying apparatus comprising a conveyor path which is movable in a generally horizontal plane, means for generating hot air within the apparatus, air-nozzles having exit orifices which lie in a common plane spaced from and above said conveyor path and are directed toward said conveyor path, and passages for conducting heated air from said generating means to said nozzles, wherein the apparatus further comprises a supporting frame structure having rollers, said rollers providing a supporting region of said conveyor path, means by which said supporting frame structure can be raised and lowered so as to selectively adjust the spacing between said conveyor path and said exit orifices, and said conveyor path being arranged to pass over a vertically fixed roller unrelated to the raising and lowering of said supporting frame structure.

4,089,124

ARITHMETIC TRAINING APPARATUS

Eric F. Burtis, 45 Melanie La., Atherton, Calif. 94025, and Ming T. Lien, San Diego, Calif., assignors to Eric F. Burtis, Menlo Park, Calif.

Continuation of Ser. No. 557,132, Mar. 10, 1975, abandoned.
This application Dec. 22, 1976, Ser. No. 753,180
Int. Cl.[2] G09B *19/02*
U.S. Cl. 35—31 C 9 Claims



1. In apparatus for training pupils in arithmetic, the improvement comprising in combination:

means for randomly generating numbers;

means responsive to said random number generating means for presenting random arithmetic problems at least some of which call for an answer having more than one digit;

means for receiving, in a digit-by-digit manner, an answer from a pupil to each presented arithmetic problem;

means connected to said presenting means and said receiving means for determining the correctness of each received answer, said determining means including means for determining as to each received digit in case of each answer comprising more than one digit, and prior to the receipt of any remaining digit of the particular answer, whether that received digit is correct in the context of the particular answer;

means operated under the control of said determining means for indicating to the pupil the correctness of each received answer, said indicating means including means for indicating to the pupil any incorrectness of a received digit and also displaying automatically to the pupil only the correct answer prior to the processing of any remaining digit in the case of an answer comprising more than one digit; and

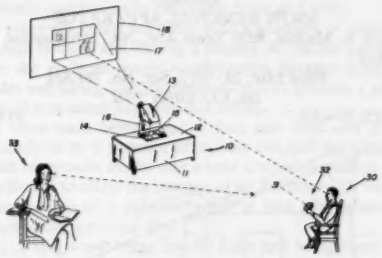
means connected to said determining means and to said presenting means for removing said indication of incorrectness and said displayed correct answer and for again causing the presentation of the same arithmetic problem to the pupil at least one additional time in correspondence to the prior receipt of an incorrect answer to that same problem.

4,089,125

COLOR-ASSIST TEACHING AID AND METHOD THEREFOR

Vera G. Enz, 132 Burton Pl., Edmond, Okla. 73034, and Philip I. Enz, 279 S. Downey, Indianapolis, Ind. 46219

Filed Dec. 10, 1976, Ser. No. 749,451
Int. Cl.[2] G09B *3/00*
U.S. Cl. 35—8 R 4 Claims



1. A method of teaching comprising the steps of:

asking a student a question;

positioning a plurality of answers marked on a transparent sheet adjacent a transparent color grid so each of said answers are associated with a different color;

projecting said plurality of answers along with said color grid onto a display surface with at least one of said answers correctly corresponding to said question;

providing a hand-held responding means having a plurality of sides, each side bearing a different color, operable to display a plurality of colors, one at a time, corresponding to each color of said color grid projected on said display surface; and,

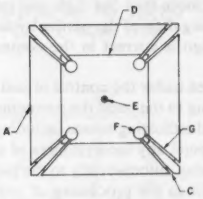
directing said student to answer said question by displaying to the teacher the side of said responding means bearing the color which is identical to said color of said one answer.

4,089,126

WRITING AND KINESTHETIC TEACHING DEVICE

Boris M. Lang, 519 Washington Rd., Woodbury, Conn. 06798

Filed Jan. 26, 1977, Ser. No. 762,762
Int. Cl.[2] G09B *11/00*
U.S. Cl. 35—36 1 Claim



1. A writing aid comprising;

a base, an opening in said base of a size to encompass a letter on an underlying sheet to be traced with a pencil;

a plate positionable over said base, a hole in said plate configured to receive the tip of said pencil; and

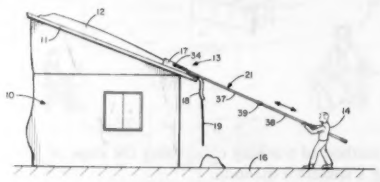
means to position said plate over said base so that the hole in said plate overlies the opening in said base, said means comprising elastic resistance means for applying forces, equal in all directions parallel to said base, tending to keep said plate centered over said base in its rest position yet permitting said plate to be moved by said pencil in directions parallel to said base while tracing a letter on said underlying sheet against the forces of said resistance means.

4,089,127

SNOW REMOVAL APPARATUS

William R. Maijala, 4029 Xenia Ave., No., Minneapolis, Minn. 55422

Filed Mar. 28, 1977, Ser. No. 781,831
Int. Cl.[2] E01H *5/02*
U.S. Cl. 37—53 10 Claims



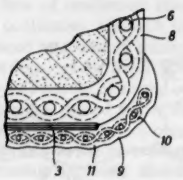
1. An apparatus for removing snow from the roof of a structure comprising: a generally U-shaped chute having a generally flat bottom wall, said bottom wall having opposite side edges, a transverse front wall edge and a transverse rear edge, upright side walls attached to the opposite side edges of the bottom wall providing a passage with open front and rear ends, and an upwardly directed transverse lip joined to the front edged, said lip extended forwardly from the front edge and at an upward edge angle relative tio the plane of the bottom wall, said lip having a transverse edge, an elongated flexible sheet member extended rearwardly from the rear edge of the bottom wall, meams attaching the sheet member to the bottom wall, an elongated handle used by an operator to move the chute, and means connecting the handle to the chute.

4,089,128

SMOOTHING OR PRESSING IRON HAVING A SOLE BODY CONSISTING AT LEAST PARTIALLY OF A GLASS MATERIAL

Erich Rudolf Baumgartner, Tiroler Platz 4, and Peter Doehler, Kaulbachstr. 59, both of Munich, Germany 8000

Filed Apr. 11, 1977, Ser. No. 786,511
Claims priority, application Germany, Apr. 13, 1976, 2616287
Int. Cl.[2] D06F *75/38*
U.S. Cl. 38—93 10 Claims



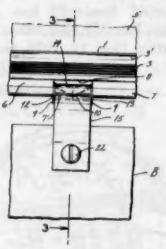
1. A smoothing or pressing iron having a sole body consisting at least partially of a glass material, wherein said sole body comprises a trough-like or hollow-body-like cup or tray of a glass-impregnated woven fabric fleece of heat-proof fibers, and a support structure filling up said cup at the inner side and having low specific heat and low thermal conductivity, and wherein, on the sole body side facing the goods being ironed, there is provided a heating conductor arrangement covered by a thin electrically insulating sole layer.

4,089,129

SIGN SUSPENSION DEVICE

Ward W. Patterson, Jr., St. Louis County, Mo., assignor to Stout Industries, Inc., St. Louis, Mo.

Filed Oct. 15, 1976, Ser. No. 732,606
Int. Cl.[2] G09F *7/22*
U.S. Cl. 40—606 7 Claims



1. For use with a rigid suspension support and a flat sheet-like sign-constituting member, a sign suspension device comprising an elongated rigid support member integrally formed to provide a coextensive mounting portion being of U-shape cross-section having a flat base and opposed side flanges, the volume of said U-shaped section being adapted to receive the suspension support and means for securing said U-shaped section to said support, there being integral with said suspension device and projecting from the exterior base portion of said U-shaped section a relatively thin web coextensive with said suspension device and there being a rod-like section integral with said web along its U-shaped section remote portion, said web having a plurality of longitudinally spaced-apart openings for cooperating with said rod to define discrete hinge rod forming sections, bearing sleeves detachably engaged upon said hinge rod forming sections, and connector means swingably disposed upon each hinge rod forming section and having

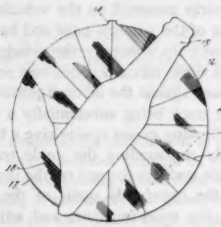
extensions therebeyond, and means engaging said extensions of said connector means to said sign constituting member.

4,089,130

ADVERTISING DISPLAY

Robert J. Byrnes, 9298 Niver, Allen Park, Mich. 48101

Filed Mar. 26, 1976, Ser. No. 670,858
Int. Cl.[2] G09F 7/00
U.S. Cl. 40—613 3 Claims



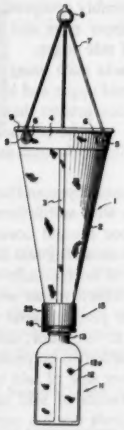
1. An air current actuated advertising display comprising a first piece, a second piece juxtaposed to said first piece, and unitarily connected thereto, at least one of said pieces being transparent at least in part so that the other of said pieces may be seen therethrough, means comprising resilient means unitarily formed with one of said pieces for suspending said pieces in spaced relation relative to each other, said resilient means being sufficiently resilient to permit relative movement upon normal air currents encountered in the area of support, and means formed on at least one of said pieces creating a visual effect upon relative motion between said pieces and upon relative movement between a viewer and said display, the unitary supporting means being disposed at opposite sides of the respective pieces for holding the opposite sides in spaced relationship.

4,089,131

APPARATUS FOR SEPARABLY COUPLING A SAMPLE CONTAINER TO A SAMPLE GATHERING DEVICE

William H. Phillips, Saginaw, Mich., assignor to Trippensee Corporation, Saginaw, Mich.

Filed Mar. 3, 1977, Ser. No. 773,955
Int. Cl.[2] A01K 73/00
U.S. Cl. 43—4 9 Claims



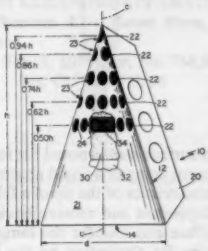
1. Sample taking apparatus comprising a sample container having an open end, a gathering device having a pliable sleeve at one end, and means sealably and separably coupling said container and said device, said coupling means comprising an annular body member fitted into said sleeve, said body member having an annular groove therein; an annular anchor member concentrically assembled with said body member with said sleeve therebetween, said anchor member having an annular groove confronting the groove in said body member; an annular, endless retainer accommodated in the groove of one of said members and projecting beyond its periphery into the groove of the other of said members, thereby causing an annular portion of said sleeve also to be accommodated in the groove of said other of said members; and means separably joining said container at its open end to one of said members.

4,089,132

SWINGING INSECT TRAP

Charles S. McLaughlin, 181 Grove St., Cambridge, Mass. 02138

Filed Sep. 30, 1976, Ser. No. 728,143
Int. Cl.[2] A01M 3/04
U.S. Cl. 43—136 4 Claims



1. An insect catcher adapted to be manually swung through the air comprising a conically shaped receptacle having a longitudinal axis therethrough,

said receptacle including an inlet which is intersected by said longitudinal axis, and

sidewalls longitudinally extending from said inlet,

said sidewalls being provided with a plurality of vents disposed therein, and having a coating of viscous substance on the surfaces spaced a substantial distance from said inlet and facing said longitudinal axis to provide a plurality of trap areas adjacent said vents,

said vents each being smaller than said inlet and spaced therefrom by a distance of at least one-half the height of said receptacle, but having a total combined passage areas sufficient to allow the passage of air therethrough without the buildup of a pressure wave at said inlet when said receptacle is swung, and

each of said vents being spaced from and being sized with respect to said inlet such that when said trap is swung, the passage of air through said vents creates an air flow generally directed into said receptacle and toward said trap areas.

4,089,133

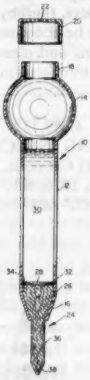
DEVICE FOR LIQUID FEEDING OF POTTED PLANTS AND THE LIKE

Vinal S. Duncan, 35 Lindsley Dr., Wolcott, Conn. 06716

Filed Dec. 8, 1976, Ser. No. 748,633
Int. Cl.[2] A01G 29/00
U.S. Cl. 47—48.5 9 Claims

1. A device for the liquid feeding of potted plants and the like; said device comprising an open end elongated tubular reservoir element for receiving a supply of approximately one to four ounces of liquid, said element having a length such that a lower end portion thereof will be disposed in the root region of a plant when the element is embedded in the soil adjacent

the plant, a closure element for the upper end thereof, and a closure and transfer element for the lower end thereof, said lower end closure and transfer element projecting upwardly within a lower end portion of the tubular reservoir element, tightly fitting the interior wall thereof, and providing a continuous exposed surface thereacross, said closure and transfer element also projecting a substantial distance beneath the lower end of the tubular element and having an elongated radially exposed surface of reduced cross sectional dimension



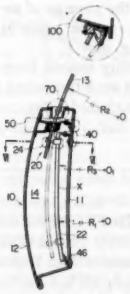
and a lower end surface also exposed for feeding the plant and said closure element being of a liquid absortive material having the general characteristics of the tip of a felt tip pen so as to be structurally independent and receive liquid and absorb at its exposed top surface and transfer the same downwardly with the aid of gravity for absorption by the soil from its lower exposed radial and end surfaces, the top-to-bottom transfer rate through the element being such that said soil absorptive action occurs over a period of at least several days when said device is filled and embedded in soil as aforesaid.

4,089,134

WINDOW GUIDE MECHANISM FOR A TIGHT AIR SEAL OF A VEHICLE WINDOW ASSEMBLY

Shyouichi Koike, Seki, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Aug. 3, 1976, Ser. No. 711,210
Claims priority, application Japan, Aug. 5, 1975, 50-95227
Int. Cl.² E05F *11/52*
U.S. Cl. 49—227 **3 Claims**



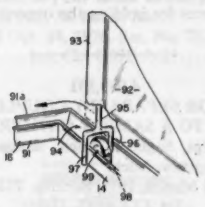
1. A vehicle window guide mechanism comprising, in combination, a slidable, curved window pane movable between a raised and a lowered position through a window storage space defined by a body of a vehicle, the window pane having a predetermined radius of curvature; a vertically curved elongate guide track mounted on the vehicle body, said guide track including a lower section having a predetermined radius of curvature which is substantially equal to the radius of curvature of the window pane and an upper section having a predetermined radius of curvature which is substantially greater than the radius of curvature of the window pane; a guide following means secured to the window pane for slidably engaging the guide track to be guided therealong; restraining means for restraining the lateral movement of the window pane at the upper edge of the window storage space during raising and lowering movement of the window pane; a resilient window weatherstrip mounted on the vehicle body adjacent the raised position of the window pane and having an inboard lip and an outboard lip, whereby the window pane during raising movement slants inboard about said restraining means to be tightly pressed against the inboard portion of the weatherstrip; the guide track being substantially a channel section and said guide following means comprising a box-section slide block substantially surrounding the guide track and having two projected slide surfaces formed on the inner side walls to slidably engage the outer side walls of the guide track; a bracket fixed to the window pane; and adjustable support means integral with the slide block for mounting the slide block on said bracket allowing a slight lateral and angular displacement of the slide block with respect to the guide track.

4,089,135

SLIDING DOOR ASSEMBLY

Janos Beny, 202 Calle de Sirenos, Redondo Beach, Calif. 90277, and Daniel H. Meggs, 4313 Vista Largo, Torrance, Calif. 90505

Continuation-in-part of Ser. No. 492,517, Jul. 29, 1974, Pat. No. 3,990,183. This application Sep. 30, 1976, Ser. No. 728,255
Int. Cl.² E05D *15/58*
U.S. Cl. 49—257 **3 Claims**



1. Sliding Door Assembly comprising:

a door having an upper edge and a lower edge interconnected by vertical side edges;

upper and lower tracks each being mounted vertically one above the other, said upper and lower tracks spaced apart at a selected distance greater than the height of said door so that said door may be positioned therebetween, said lower track including a channel, an inner side and an outer side, and;

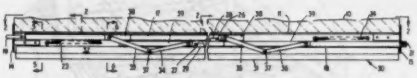
means mounted on said upper and lower edges of said door which cooperates with and follows said tracks to permit sliding of said door around corners and curves of said tracks, said means mounting said door on said lower track including a pair of horizontally spaced apart rotatably mounted wheels which rotate within said tracks to roll therealong and be pivotal about a substantially vertical axis with respect to said door, said means includes crank arms which is adapted to be positioned to extend downwardly on the inner side of said tracks and is adapted to strike the inner radius of said inner side of said track whenever said wheels reach a corner, whereby the force of said tracks against said crank arm causes said wheels to pivot with respect to said door thereby aiding the movement of said wheels around a corner in said tracks.

4,089,136

WEATHER EXCLUDER

Richard Lapinski, Fairfield West, and Marian Richard Matusjewski, Bankstown, both of Australia, assignors to Catuma Pty. Ltd., Australia

Filed Jun. 7, 1976, Ser. No. 693,183
Int. Cl.[2] E06B 7/21
U.S. Cl. 49—308 8 Claims



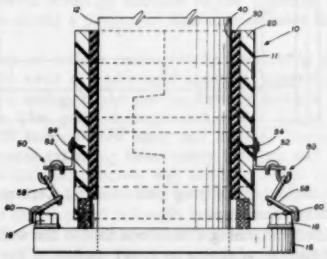
1. A weather excluder for attachment at the foot of a door comprising: a closure member capable of vertical movement towards the floor upon closing of said door and away from the floor upon opening of said door; first means engaging the hinge side door jamb to provide a first stage of said vertical movement uniformly over the full length of the closure member; second means engaging the lock side door jamb to provide a further stage of said vertical movement uniformly over the full length of the closure member; a pair of parallel bars each capable of independent longitudinal movement, said bars cooperating respectively with said first and second means, said closure member being coupled to said bars and said bars are each resiliently biased toward a rest position corresponding to the open position of the door; and a pair of parallel links coupling each of the bars to the closure member, each link being pivotally connected at one end to one of the bars and pivotally connected at its other end to the closure member.

4,089,137

SLEEVE ASSEMBLY

John H. Wheeler, Dallas, Tex., assignor to The Texacone Company, Dallas, Tex.

Filed Sep. 10, 1976, Ser. No. 721,984
Int. Cl.[2] B24B 19/00; B24D 3/22
U.S. Cl. 51—241 S 6 Claims



1. A sleeve assembly for removing rust and corrosion from a piston in a hydraulic cylinder or the like having a stuffing box, which comprises:

an annular upper ring member comprised of a rigid material and having first and second semicircular sections, each section including at least one aperture therein;

an annular lower C-ring member comprised of a resilient material having abrasive particles embedded therein and positioned between the upper ring member and the stuffing box;

said upper ring and lower C-ring members encircling the piston rod;

first hose clamp means surrounding the upper ring member for releasably engaging the first and second sections thereof in proximate circumferential relationship about the piston rod;

second hose clamp means surrounding the lower C-ring member for adjustably pressing said C-ring member into interference contact with the piston rod; and

means for securing the upper ring member to the stuffing box whereby axial movement of the piston rod effects rust and corrosion removal;

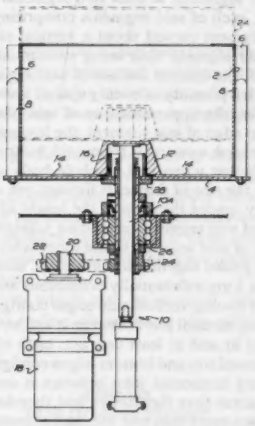
said securing means including a first coupling end portion releasably insertable in the apertures of the upper ring member and having a second coupling end portion releasably secured at the stuffing box.

4,089,138

BLAST CLEANING APPARATUS

James Farquhar Thomson, Low House Farm, Timble, Otley, Yorkshire, England

Filed Feb. 1, 1977, Ser. No. 764,504
Int. Cl.[2] B24C 3/26
U.S. Cl. 51—422 1 Claim



1. An apparatus for containing and rotating articles so that they can be treated with a blasting material, said apparatus, including:

(a) a perforated drum having a bottom that includes a hub and a plurality of spaced apart spokes extending outwardly therefrom,

(b) a plate which is parallel to the bottom of said drum but which is separate from said drum,

(c) means for moving said perforated drum towards and away from said plate in a direction substantially normal to said plate, said means being located beneath said plate and including a piston and cylinder means, the piston of which has one end attached to said hub and extends through the center of said plate,

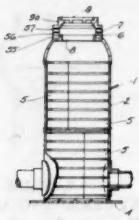
(d) a sleeve enclosing part of the piston of said piston-and-cylinder arrangement, said sleeve carrying a first toothed wheel, and

(d) means for rotating both said perforated drum and said plate, said means including an electric motor having an output shaft which carries a second toothed wheel that is positioned to engage said first toothed wheel on said sleeve.

4,089,139
SEGMENTED CYLINDRICAL REINFORCED PLASTIC MANHOLE STRUCTURE

Joseph Moffa, Middletown, and Jerald H. Boynton, Franklin, both of Ohio, assignors to Armco Steel Corporation, Middletown, Ohio

Filed Aug. 24, 1976, Ser. No. 717,506
Int. Cl.[2] E02D *29/14*
U.S. Cl. 52—20 **28 Claims**



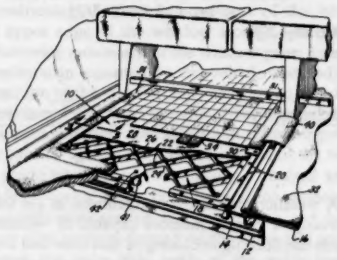
1. A segmented manhole structure comprising a hollow body surmounted by a transition element, said body being cylindrical about a vertical axis with upper and lower ends, said body comprising at least one tier of curved nestable reinforced plastic segments, at least two segments being required for each tier, each of said segments comprising a thin-walled cylindrical segment curved about a vertical axis, the exterior surface of said segment wall being substantially smooth and uninterrupted, the interior surface of said segment wall being provided with a plurality of evenly spaced inwardly extending horizontal ribs, the uppermost one of said ribs being located along said top edge of said segment, the lowermost one of said ribs being spaced upwardly from said bottom edge of said segment such that when said manhole body comprises more than one tier the ribs of segments located one above the other will be evenly spaced throughout the height of said body, said ribs of each of said segments extending substantially from one vertical edge of said segment to the other whereby, when said segments are joined together to form a tier, said interior ribs of said segments form substantially continuous annular ribs, each said segments having vertical side edges configured to provide an interlocking vertical joint between it and an adjacent one of said segments in said at least one tier, each of said segments having horizontal top and bottom edges configured to provide an interlocking horizontal joint between it and adjacent segments of adjacent tiers thereabove and therebelow when said body comprises more than one tier, said segments of said body being joined together by an adhesive sealant at said vertical and horizontal interlocking joints rendering said joints fluid tight, said transition element being supported on said upper end of said body, means for forming a fluid-tight seal between said transition element and said upper end of said body, said transition element having an access opening therein and being configured to support a conventional manhole cover and frame assembly to close said access opening.

4,089,140
CARPET INSTALLATION FOR FRANGIBLE AIRCRAFT FLOORS

Robert G. McIntyre, Manhattan Beach, and Otto J. Minnich, Orange, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Sep. 24, 1976, Ser. No. 726,136
Int. Cl.[2] B64C *1/10, 1/00*
U.S. Cl. 52—98 **6 Claims**

1. A carpet-covered frangible floor installation comprising:
underlying grid means defining openings of a predetermined size;
frangible panel supported by said grid means;
positioning and hold-down tiles which are smaller than the openings of a predetermined size in said grid means, said tiles affixed to said panel, the area of attachment between each of said tiles and said panel covering substantially less than the total area of said tile; and

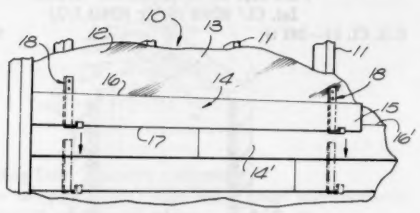


carpet pieces positioned on each of said positioning and hold-down tiles and affixed to said tiles, said carpet pieces being sized to pass with ease through said grid openings with said positioning and hold-down tiles.

4,089,141
APPLICATION OF SIDING, SHINGLES OR SHAKES TO A WALL STRUCTURE

George Armand Heroux, 617 Douglas Ave., Prescott, Ariz. 86301

Filed Dec. 1, 1976, Ser. No. 746,583
Int. Cl.[2] E04B *1/00;* E04D *1/34*
U.S. Cl. 52—105 **12 Claims**

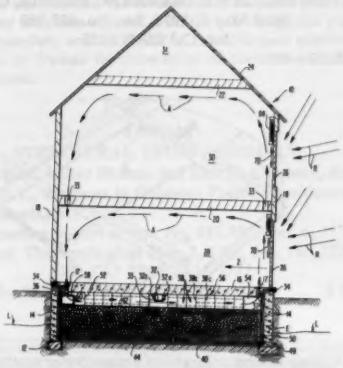


1. The method of applying wall covering elements to a wall structure that comprises:
temporarily attaching at least one tool to the wall structure by a fastener engaging an upper portion of the tool, with said tool having an arm extending downwardly from the location of the fastener and adjacent the wall structure and having a projection which extends outwardly at a location spaced beneath said fastener a distance greater than the vertical dimension of said covering element;
supporting a wall covering element by said projection of the tool and at the outer side of said arm, with the arm received between the covering element and the wall structure and projecting upwardly beyond said covering element and with said fastener exposed above the covering element;
attaching the covering element to the wall structure;
acting against said exposed fastener above the covering element to disconnect the tool from the wall structure; and
sliding the arm of the tool out from behind the covering element.

4,089,142
SOLAR-HEATED CONCRETE SLAB BUILDING STRUCTURE

James Kachadorian, Royalton, Vt. 05068

Filed Mar. 30, 1977, Ser. No. 782,811
Int. Cl.[2] E02D 27/32; F24H 7/00
U.S. Cl. 52—169.11 5 Claims



1. In a building structure comprising a building structure foundation supporting a building enclosure mounted thereon, said building enclosure comprising laterally spaced, opposed sidewalls, the improvement comprising:

a concrete slab underlying said building structure, being within said foundation, forming the ground floor of said building structure and being interposed between said building enclosure and the ground,

thermal insulation surrounding the periphery of said concrete slab and extending from the surface of the ground at a level below the ground frost line,

an array of hollow cinder blocks, said cinder blocks underlying said concrete slab, being in situ with said slab,

a layer of gravel interposed between said cinder blocks and the ground and extending below the frost line such that the gravel forms in addition to the concrete slab and cinder blocks a portion of a composite three layer heat sink,

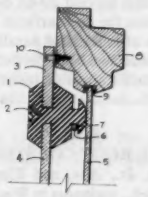
said array of hollow cinder blocks comprising generally parallel rows of end-to-end abutting, generally axially aligned, hollow cinder blocks, forming multiple horizontal air flow paths through said cinder blocks directly beneath said concrete slab, said multiple horizontal air flow paths extending transversely between said opposed side walls, said concrete slab and said cinder blocks extending the full distance between said opposed sidewalls, one of said opposed sidewalls being essentially devoid of windows and the other of said opposed sidewalls having windows extending over a substantial area thereof, and

means defining air passages extending longitudinally along both ends of said array of cinder blocks, and being open to the air flow paths through said cinder blocks, and vertical air flow paths through said concrete slab from said building enclosure interior to said air passages and wherein said one of said opposed sidewalls faces the direction of major solar radiation and the other of said opposed sidewalls faces away from said direction of major solar radiation such that direct solar radiation through said one of said opposed sidewalls into said building enclosure interior and onto said slab causes a natural thermal syphonic air circulation loop through said building enclosure interior and through said vertical air flow paths within said solar slab and said horizontal air flow paths through said cinder blocks with said concrete slab and said cinder blocks and said gravel constituting a low thermal impedance heat sink for reception and release of heat transmitted to the building by conduction from the ground through the cinder blocks, by direct solar radiation of said concrete slab and by convection of air passing over said concrete slab with said heat sink effectively storing heat during solar radiation of said building structure but remaining at a temperature less than that of said building enclosure interior.

4,089,143
METHOD OF CONVERTING SINGLE PANE GLASS TO MULTIPLE PANE, HERMETICALLY SEALED INSULATING GLASS WITHOUT REMOVING THE EXISTING GLASS SASH AND FRAME

Jack La Pietra, Turtle Creek, Pa., assignor to James W. Mulvihill, Bethel Park and Youssef Amine, Pittsburgh, both of, Pa., part interest to each

Filed Mar. 28, 1977, Ser. No. 782,292
Int. Cl.[2] E06B 7/12, 3/26
U.S. Cl. 52—172 3 Claims



1. An assembly for adding a glass pane to an existing window without removing the existing sash and frame comprising;

a support frame defining a continuous inwardly directed flange which may be secured to the sash spaced from the existing pane,

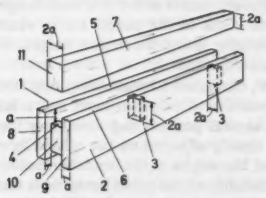
a gasket having two slots opening away from each other, a sealing rib extending generally perpendicular to the two slots and a groove opposite the sealing rib, such that one slot engages the continuously inward directed flange, the other slot engages the additional pane, the sealing rib abuts the existing pane to seal the space between it and the additional pane, and

a retaining strip which may be snapped into the groove opposite the sealing rib to secure the additional pane in place.

4,089,144
BUILDING ELEMENT

Franz Astl, Klinkstr. 8, 6332 Kufstein, Austria

Continuation-in-part of Ser. No. 563,121, Mar. 27, 1975, abandoned. This application Dec. 27, 1976, Ser. No. 754,263
Claims priority, application Austria, Mar. 28, 1974, 2584/74
Int. Cl.[2] E04B 1/02; E04C 1/10
U.S. Cl. 52—281 14 Claims



1. A building assembly for the production of dismountable internal and external walls, fences, parapets, sheathings, and the like; said building element comprising:

two elongate parallelly extending flat boards of the same size;

at least two plates extending transversely of and fixed to said

two flat boards to space said two flat boards from each other to form an entity;

each said plate having first and second opposite edge surfaces fixed to respective of said flat boards;

each said plate having a third edge surface at a first position spaced by a first given distance from first longitudinal edges of said two flat boards;

each said plate having a fourth edge surface, opposite to said third edge surface, at a second position spaced by a second given distance from second longitudinal edges of said two flat boards;

each said plate being formed of a single element between said respective first and second positions;

said first given distance being equal to said second given distance;

a tongue element insertable between said two flat boards in a position to contact one of said third and fourth edge surfaces of each of said plates, the breadth of said tongue element being equal to twice said first given distance and equal to twice said second given distance; and

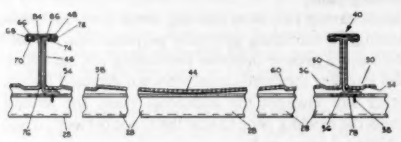
the distance between the end surfaces of said two flat boards and the surfaces of said plates parallel and adjacent to said end surfaces of said two flat boards being equal to one half the breadth of said tongue element.

4,089,145

METAL ROOF CONSTRUCTION

William S. DeVries, Jr., Ada, and Elmer M. Malek, Grand Rapids, both of Mich., assignors to Wm. DeVries & Sons, Inc., Grand Rapids, Mich.

Filed Sep. 1, 1976, Ser. No. 719,351
Int. Cl.[2] E04C *1/38*
U.S. Cl. 52—461 **20 Claims**



1. In a metal roof construction supported by a roof support means, the roof construction having:

a plurality of elongated panels joined together at the side edges thereof, each panel having a relatively flat central portion generally defining a plane and flanked by a pair of upstanding substantially vertical side walls with inwardly directed flanges at the top portions thereof, said side walls extending down to the plane of the central portion, means extending between adjacent panels and over the top of the inwardly directed flanges of the panel side walls for securing the panels to the roof support means; and

elongated batten strips crimped around the joints between the adjacent panels at the side wall flanges thereof so that the side walls of the panels are in abutting relationship substantially along the entire height, the improvement which comprises:

a shallow, elongated strengthening step rib formed solely of an upward or downward bend and a lateral bend in the panel central portion and extending the length of each panel closely adjacent to, but spaced from, each side wall thereof, the angles of the bends formed by the step rib and the flexibility of the panel being such that said panel central portion extends out of said plane at said step rib but returns to said plane adjacent thereto;

the strengthening step rib being shallow enough so as to maintain the flat nature of the panel central area and close enough to the side walls such that the strengthening step rib provides a point of flexure for the panel central portion under high upward stress and the strengthening rib being located sufficiently close to the upstanding side wall so as to strengthen the bottom portion thereof against a buckling force;

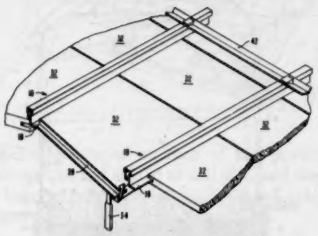
whereby the panel side walls have a significantly increased resistance to buckling at the bottom portion thereof.

4,089,146

SUSPENDED CEILING

Vincent Martinez, 2078 E. Oakwood St., Pasadena, Calif. 91104

Filed May 6, 1976, Ser. No. 683,760
Int. Cl.[2] E04B *5/55*
U.S. Cl. 52—484 **7 Claims**



1. A ceiling system comprising a plurality of parallel, spaced-apart runners and a plurality of parallel, spaced-apart cross members extending between said runners,

each of said runners consisting of an elongated member having throughout its length the same asymmetric cross-section comprising:

a closed upper end wall, closed generally downwardly extending side walls depending from said closed upper end,

a lower end wall depending from said side walls having a slot therein extending the length of said runner adapted to receive an upright, a lateral flange depending from only one of said side walls, said flange being adapted to support the edge of ceiling tile,

said cross members also being adapted to support the edge of ceiling tile,

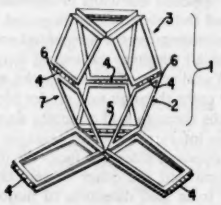
each cross member resting at one of its ends on said flange and the other of its ends including said upright.

4,089,147

MODULE HAVING COLLAPSIBLE PROPERTIES

Sujash Kumar Bain, D-3, Maharani Bagh, New Delhi-14, India

Filed Sep. 8, 1976, Ser. No. 721,369
Claims priority, application United Kingdom, Aug. 2, 1976, 32133/76
Int. Cl.[2] E04G *25/02*; E04H *12/18*
U.S. Cl. 52—632 **12 Claims**



1. A collapsible module comprising an upper and lower member provided in an opposite relationship to each other, each of said members comprising an equilateral polygon base plate or frame, a plurality of side frames or plates, of the same number as the number of sides of said polygon hingedly connected at their proximal end to said base plate or frame, the distal end of said side frames being hingedly connected to the distal end of the side frames or plates of the other member,

wherein the sides of said side frames taper inwardly from said base plate or frame to give a trapezoidal configuration to each of said side frame or plates, the center of the hinge of the proximal side coinciding with the center of the hinge at the distal side of the same side plate or frame and the center of the proximal side of a side plate of one member coinciding with the center of the proximal side of the side plate of the other member to which it is hinged, such that in an erect position the side plates of each member are disposed inwardly to the vertical axis of said module and the two sides of one side plate of any one member is in side contact with the adjoining side plates of the same member, and such that in the collapsed position said side plates or frames lie outwardly of their respective base plate or frame.

4,089,148

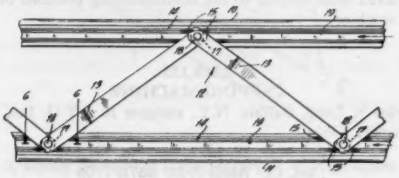
STRUCTURAL TRUSS ASSEMBLY

Erich Oehmsen, Valley Stream, and Karl H. Oehmsen, Sayville, both of N.Y., assignors to Oehmsen Plastic Greenhouse Mfg. Inc., Bohemia, N.Y.

Continuation-in-part of Ser. No. 617,301, Oct. 6, 1975, abandoned. This application Nov. 1, 1976, Ser. No. 737,734

Int. Cl.² E04C *3/04, 3/11*

U.S. Cl. 52—693 **6 Claims**



1. A structural truss comprising at least two spaced elongated T-shaped rails consisting of a horizontal flanged portion and an elongated track having a substantially "C" shaped cross sectional shape normally disposed on the flanged portion, a plurality of flat headed rivets slidably received within the "C" shaped track, said rivets having shank portions extending through the apertures of the "C" shape and outwardly of said track, a plurality of struts comprising elongated bar shaped members apertured adjacent each end thereof and disposed as a series between the rails with their adjacent apertured ends slipped over one of said rivet shanks and freely and rotatably secured thereto and at least one deformed portion on the tracks adjacent each of the ends of the links to prevent longitudinal movement of the rivets with respect to the rails.

4,089,149

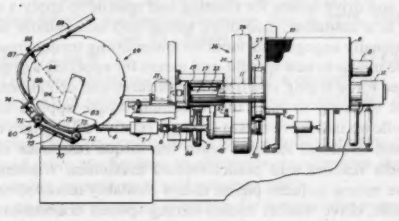
PROCEDURE FOR FORMING TAMPON SACKS AND FILLING SAME WITH AGGREGATE

Stephen F. Evans, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 536,832, Dec. 27, 1974, Pat. No. 4,019,306. This application Jul. 8, 1976, Ser. No. 703,620

Int. Cl.² B65B *1/26, 9/06*

U.S. Cl. 53—24 **7 Claims**



1. A method for filling a continuous length of flexible tubing at predetermined spaced apart intervals with measured charges of filling material, comprising the steps of advancing a length of tubing in a path of travel, pinching the tubing together at a first point to form a closed but unsealed leading closure, introducing a measured charge of filling material into the tubing from its trailing end and propelling the charge forwardly through the tubing until it comes to rest at said leading closure, pinching the tubing together at a second point to form a second closed but unsealed closure spaced rearwardly from said first closure with the charge of filling material captured between the first and second closures, sequentially closing and filling additional lengths of the tubing in like manner, with the second closure of the first filled length of tubing serving as the leading closure for the next to be filled length of tubing, sequentially releasing the tubing at the pinched together points subsequent to the capture of a charge of filling material between adjacent points, including the step of compressing the charges of filling material within the tubing to maintain the charges in discrete condition within the tubing upon release of the tubing at the pinched together points.

4,089,150

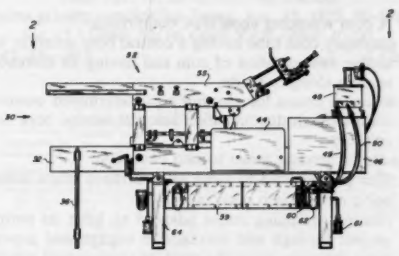
APPARATUS AND METHOD FOR CASE PACKING SMALL CONTAINERS AND ARTICLES

Raymond A. Heisler, 657 Dakota Trail, Franklin Lakes, N.J. 07417

Filed May 23, 1977, Ser. No. 799,729

Int. Cl.² B65B *43/28, 35/50, 57/10*

U.S. Cl. 53—29 **36 Claims**



28. A method for receiving, transporting, withdrawing and erecting folded cartons for use in and with adjustable case packing apparatus, said method including the steps of: (a) providing a frame including side guides adjustably movable to guide a selected size of carton, said frame providing a support surface for receiving and maintaining folded cartons in a substantially side-by-side condition; (b) advancing the folded cartons along said frame and within said guides to an adjustably sized delivery chute wherein the folded cartons are supported in a stacked and sloped condition such as thirty degrees to a horizontal; (c) positioning a carton escapement apparatus in association with the delivery chute with the escapement apparatus having a carton stop actuated by a single means whereat in one limit of movement this stop supports an outer edge of the lowermost carton in the sloped stack of folded cartons and when this carton stop is moved to and near its other limit of movement the engaged edge of the lowermost carton is released for removing from the stack; (d) adjusting the width and length of the chute and carton stops to accommodate a size within a selected range of sizes of cartons, the carton escapement positioned to receive and retain and then release the outer edge of the lowermost carton; (e) engaging the lowermost carton by a plurality of cups and vacuum applied thereby and to move this carton to an erected condition; (f) providing at least one infeed accumulating conveyor to receive the products in a determined grouping; (g) actuating an automatically, adjustably controlled pusher for moving the grouping of products from a position adjacent the opened

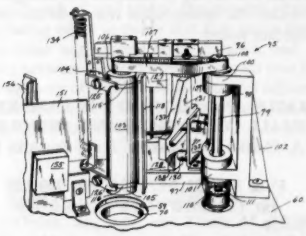
carton to and into the opened carton, the stroke so adjusted that the grouping is moved into the erected carton sufficiently for opposite end flaps of the carton to be closed; (h) adjustably moving a means for engaging the leading lower edge of the erected carton and for retaining this carton as it is advanced forwardly whereat the engaging means is moved from an engaging position allowing the filled carton to be further advanced, and (i) gluing, closing and delivering the filled carton from the apparatus.

4,089,151

COIN WRAPPING MACHINE

Charles T. Bergman, and Robert L. Zwieg, both of Watertown, Wis., assignors to Brandt, Inc., Watertown, Wis.

Filed May 11, 1977, Ser. No. 795,730
Int. Cl.[2] B65B *57/20, 11/04*
U.S. Cl. 53—59 R **21 Claims**



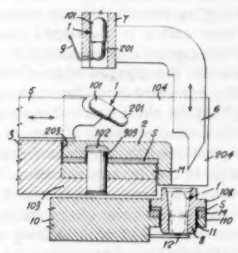
1. A coin wrapping apparatus, comprising:
a stationary coin tube having a central bore sized for a particular denomination of coin and having an entrance extending along one side;
coin count means for ejecting a predetermined quantity of coins of such denomination into the central bore of said coin tube;
means for feeding paper to said coin tube;
a filler pad adapted to close said entrance while coins are being ejected into said coin tube;
a rotating wrapping roller adapted to have its periphery project through said entrance to engage said paper and wrap the same about the stack of coins in said tube; and
means mounting said filler pad and wrapping roller for movement relative to said entrance so that one or the other of said filler pad and wrapping roller can be moved into place at said entrance.

4,089,152

CAPSULE FILLING MACHINE

Luciano Zanasi, 7/5 Via Monaldo Calari, Bologna, Italy

Filed Mar. 4, 1977, Ser. No. 774,347
Claims priority, application Italy, Mar. 5, 1976, 12516 A/76
Int. Cl.[2] B65B *1/04, 43/40*
U.S. Cl. 53—281 **3 Claims**



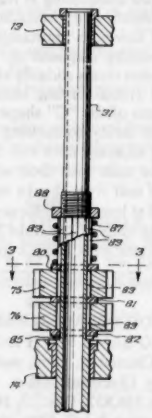
1. A machine for handling capsules comprising means for aligning, holding, opening, filling and closing capsules, including
(a) means for aligning said capsules in an upright position;
(b) a release mechanism operable to permit a said capsule to drop into a substantially L-shaped, channel-like passage;
(c) means within said passage for moving said capsule through said passage;
(d) a socket-shaped means at the end of said passage for receiving and holding said capsule;
(e) a first rotary conveyor;
(f) a device for opening said capsule;
(g) a second rotary conveyor on which said opening device is mounted and which is located below said first rotary conveyor;
(h) a second release mechanism operable to permit a said capsule to drop from said socket-shaped means into said opening device;
(i) means for filling said capsule;
(j) means for closing said capsule;
(k) permanent magnets provided on portions of said machine; and
(l) portions of ferromagnetic material on said capsule handling means interacting with respective said permanent magnets, whereby said capsule handling means are centered with respect to the corresponding portions of said machine.

4,089,153

CAPPING MACHINE

Charles N. Long, Buffalo, N.Y., assignor to A-T-O, Inc., Willoughby, Ohio

Filed Mar. 28, 1977, Ser. No. 781,552
Int. Cl.[2] B65B *7/28;* **B67B** *1/06*
U.S. Cl. 53—331.5 **5 Claims**



1. Container capping apparatus comprising a generally vertical rotatable spindle having a cap holding chuck at its lower end and drive means for rotating said spindle to apply a screw cap to a container, said drive means and said spindle having frictionally engaging surfaces for transmitting torque from said drive means to said spindle, and means for applying a predetermined force urging said frictional surfaces into driving engagement whereby to limit the maximum torque applied to said spindle by said drive means through relative sliding movement of said frictional surfaces when the torque resistance of said spindle reaches said predetermined maximum, wherein said drive means includes pinion means rotatably mounted on said spindle, drive washer means having splined connection with said spindle and bearing frictionally against said pinion means in radial face-to-face contact, and means for urging said pinion

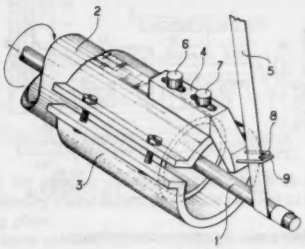
means and said drive washer means in face-to-face contact under a predetermined axially directed force.

4,089,154

TAPING DEVICE, PARTICULARLY FOR OPTICAL FIBRES

René Dubost, Faverges de la Tour, and Bernard Grenat, La Mulatiere, both of France, assignors to Les Cables de Lyon S.A., Lyon, France

Filed Mar. 30, 1977, Ser. No. 783,018
Claims priority, application France, Apr. 6, 1976, 76 09920
Int. Cl.[2] D02G *3/38*
U.S. Cl. 57—3 3 Claims



1. A taping device for taping products which require tension-free application of tapes having a high modulus of compressibility to the product, the taping device comprising a die-box mounted to rotate about the product to be taped which lies along the main axis of the device, a support gripping said die-box, a plurality of tape guides fixed on said support, pairs of L-shaped hooks fixed on said tape guides to guide the tapes at a point distant from the taping point by a distance of not more than twice the diameter of the product to be taped, wherein said support is adjustable on the die-box to rotate about and to move linearly along the main axis of the machine, so as to adjust the position of the taping points and wherein the tape guides are adjustable independently on their support in a linear movement parallel to the main axis of the device.

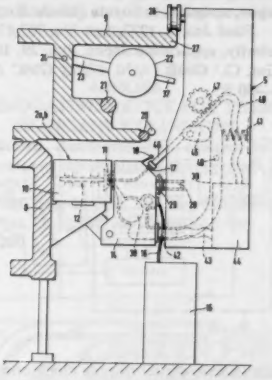
4,089,155

OPEN-END SPINNING MACHINE WITH FACILITIES AND METHOD FOR THE SIMULTANEOUS PIECING OF ALL SPINNING UNITS

Fritz Stahlecker, Josef-Neidhart-Strasse 18, 7341 Bad Ueberkingen, Germany, assignor to Fritz Stahlecker and Hans Stahlecker, both of, Germany

Filed Nov. 30, 1976, Ser. No. 746,173
Claims priority, application Germany, Dec. 6, 1975, 2555058
Int. Cl.[2] D01H *15/00*
U.S. Cl. 57—34 R 33 Claims

1. Open-end spinning machine apparatus comprising:
a plurality of spinning units with centrally controlled drive mechanisms,
piecing program control means for controlling starting-up of said drive mechanisms to effectuate simultaneous thread-piecing operations at said spinning units,
and piecing preparation apparatus for sequentially preparing a plurality of said spinning units for the piecing operations, said piecing preparation apparatus being movable sequentially to a plurality of the individual spinning units and being equipped with thread seizing means and thread



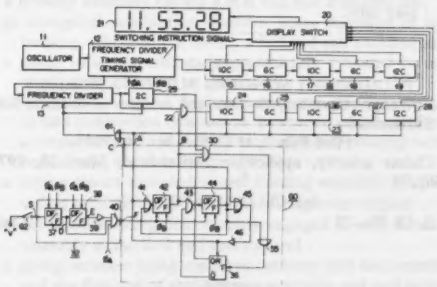
returning means for seizing and returning thread ends to respective spinning rotors of the spinning units.

4,089,156

STOP WATCH DEVICE

Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Apr. 19, 1976, Ser. No. 678,359
Claims priority, application Japan, Apr. 22, 1975, 50-48956
Int. Cl.[2] G04B *19/34;* G04C *3/00;* G04F *10/00*
U.S. Cl. 58—39.5 4 Claims



1. A stop watch device comprising:
a source of clock pulse signals;
a time-counting circuit coupled to said source of clock pulse signals for counting the clock pulse signals;
a switch for coupling a count start instruction to said time-counting circuit upon a given operation of said switch;
means coupled to said time-counting circuit and to said switch for causing said time-counting circuit to stop counting said clock pulse signals upon detection of another operation of said switch after said given operation thereof;
detection means coupled to said switch for detecting two consecutive operations of said switch made within a predetermined short period of time during which said switch can be operated twice, and for generating a detection signal responsive to said detected consecutive operations of said switch; and
means coupled to said detection means and to said time-counting circuit for clearing said time-counting circuit in response to said detection signal from said detection means.

4,089,157
DIGITAL CLOCK FOR MOTOR VEHICLES

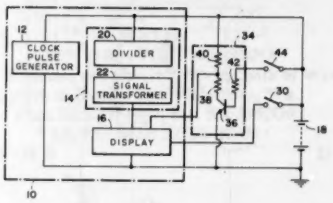
Toshinobu Kuroyama, Kasugai, and Hisashi Hirose, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo K.K., Japan

Filed Jan. 7, 1977, Ser. No. 757,475

Claims priority, application Japan, Jun. 29, 1976, 51-76885

Int. Cl.² G04B *19/30, 47/00;* **G04C** *3/00*

U.S. Cl. 58—50 R **9 Claims**



1. A motor vehicle digital display clock comprising:

at least one fluorescent type digital display tube for displaying the time provided in the passenger compartment of the motor vehicle, said fluorescent type tube including a grid, a cathode and anodes;

a means for generating time signals to be displayed on said fluorescent tube;

a selection switch means provided in said passenger compartment which determines the brightness of said fluorescent type tube; and

a brightness control circuit coupled to said grid of said fluorescent type display tube which controls the brightness of said fluorescent type digital display tube in response to said selection switch means by controlling a voltage applied to said grid of said fluorescent type display tube.

4,089,158
FLUID-TIGHT WINDING BUTTON ASSEMBLY

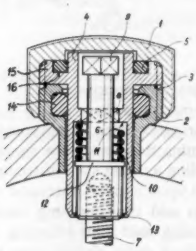
Karl Wenger, Chambesy, Switzerland, assignor to Boninchi S.A., Switzerland

Filed Feb. 2, 1977, Ser. No. 764,993

Claims priority, application Switzerland, Mar. 23, 1976, 3602/76

Int. Cl.² G04B *3/00, 37/10*

U.S. Cl. 58—73 **1 Claim**



1. A fluid-tight winding button assembly of the type comprising a button head which can be screwed onto and unscrewed from a pendant tube, the button head carrying a sleeve disposed about a winding-stem shank, and the sleeve and shank having interengageable complementary non-circular parts forming means for coupling the shank for rotation by the button head when the latter is unscrewed from the pendant tube, wherein the button head has an external skirt with an inner cylindrical surface screw-threaded along its entire length, said sleeve being fully screwed in said skirt in an end part of its thread and the remainder of the thread of said skirt being screwable on the pendant tube, a biasing spring acting between said sleeve and a shoulder on said shank to bias the sleeve and shank towards a coupling position, a first sealing joint being interposed between said sleeve and the button head, and a second sealing joint being interposed between the sleeve and the pendant tube.

4,089,159
ELECTRONIC TIMEPIECE

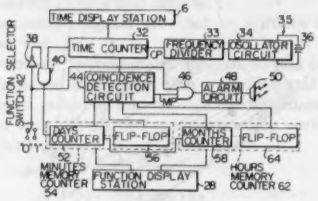
Makoto Yoshida, Tokorozawa, Japan, assignor to Citizen Watch Company Limited, Tokyo, Japan

Filed Jun. 21, 1976, Ser. No. 698,454

Claims priority, application Japan, Jun. 23, 1975, 50-77428; Jul. 1, 1975, 50-81228; Jul. 7, 1975, 50-83317; Jul. 8, 1975, 50-83150

Int. Cl.² G04B *37/12*

U.S. Cl. 58—152 R **44 Claims**



1. An electronic timepiece comprising:

a frequency standard;

a frequency divider which divides an output frequency of said frequency standard to provide output pulse signals;

a time counter driven by said output pulse signals to provide time information signals;

counter means coupled to said time counter to form a serial counter chain and operative to function in one of first and second modes;

circuit means connected between said time counter and said counter means for permitting transfer of said time information signals to said counter means whereby said counter means operates in said first mode for producing a first data signal, said circuit means including means for interrupting the transfer of said time information signals to said counter means and permitting entry of input signals other than said time information signals into said counter means whereby said counter means operates in said second mode for producing a second data signal other than said first data signal;

means for producing said input signals;

means for controlling said circuit means to cause said counter means to operate in one of said first and second modes; and

means for providing a display of said time information signals, first data signal and said second data signal.

4,089,160
HORSESHOE BENDING APPARATUS AND VISE

Bud A. Beaston, Rte. 1, Box 13, Sperry, Okla. 74073

Filed Feb. 18, 1977, Ser. No. 769,859

Int. Cl.² B21K *15/02*

U.S. Cl. 59—56 **9 Claims**

1. A horsehoe bending apparatus for forming horseshoes from strip bar stock and comprising:

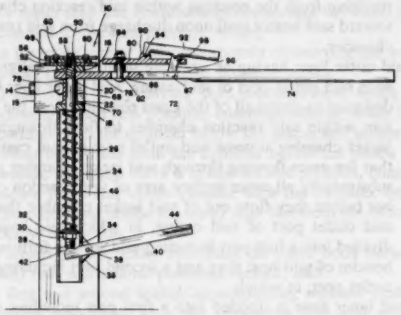
(a) stationary frame means;

(b) form support means pivotally carried by the frame means, a forming plate carried on the support means and having a portion of the outer edge thereof in the shape of the inner periphery of the desired horseshoe, a pair of oppositely disposed guide plates carried by the support means on opposite sides of the forming plate for providing

a channel around the outer edge of said forming plate for receiving bar stock therein;

(c) a bending stop member secured to the frame means and spaced from the forming plate, said stop member having a groove therein in a plane parallel to that of the forming plate;

(d) bar stock engaging means carried by the form support means for selective engagement with one end of the bar stock;



(e) means for rotating the engaging means with respect to the stationary frame means in a plane parallel to that of the forming plate;

whereby upon rotation of the engaging means, the bar stock segment is pulled through the bending stop member groove and is bent around said shaped portion of the forming plate outer edge to form a horseshoe.

4,089,161

WRIST BAND

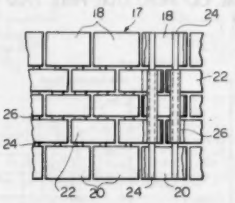
Ryozo Aoki, Tokyo, Japan, assignor to Citizen Watch Company Limited, Tokyo, Japan

Filed Jan. 17, 1977, Ser. No. 759,957

Claims priority, application Japan, Jan. 21, 1976, 51-6095[U]; Mar. 30, 1976, 51-38391[U]

Int. Cl.[2] F16G *13/18*

U.S. Cl. 59—80 **12 Claims**



1. A wrist watch band comprising:

a plurality of transversely spaced end lugs each having a hollow portion;

a plurality of center links disposed between said transversely spaced end lugs, each of said plurality of center links having a hollow interior;

a plurality of connecting rods, each of which has an outer diameter substantially equal to the width across the hollow portion of each end lug and, two of which extend through each of said center links and are fitted at each end to the hollow portion of each end lug; and

a plurality of cylindrical center sheaths disposed on said connecting rods, respectively, and each extending through the hollow interior of each center link, each of said plurality of cylindrical center sheaths having its outer diameter smaller than the diameter across the hollow interior of said each center link and its inner diameter larger than the outer diameter of each connecting rod, whereby said each center sheath is free to rotate about said each connecting rod, thereby to provide the watch band with increased flexibility.

4,089,162

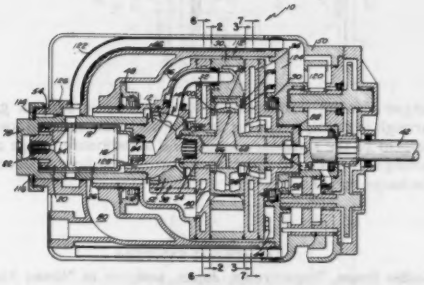
ACCOMMODATING DEVICE FOR THERMAL TRANSIENT EXPANSIONS

Giovanni J. Silvestri, Barrington, R.I., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 3, 1976, Ser. No. 720,314

Int. Cl.[2] F02B *75/36;* **F02G** *3/00*

U.S. Cl. 123—200 **5 Claims**



1. An accommodating device for compensating thermal transient expansions in a rotary engine which comprises:

a housing assembly having a first end and a second end;

an elongated combustion chamber being mounted in said housing, said chamber having a first end and a second end;

a pintle valve assembly being detachably mounted to said combustion chamber at the first end thereof;

an inlet valve having a stationary male part being connected to said combustion chamber at the second end thereof and a rotatable female part being secured to the rotating members of said expander engine;

a keying means mounted in said housing assembly for providing a reference ground for said expander engine;

a nut member being demountably engaged to said housing assembly at the first end thereof; and

a spring member being mounted between said nut member and the first end of said housing assembly and said spring member being in contact with said combustion chamber.

4,089,163

EXHAUST PORT LINER FOR ENGINE

Shuichi Yamazaki, and Shinichi Shimada, both of Kamifukuoka, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 16, 1976, Ser. No. 677,667

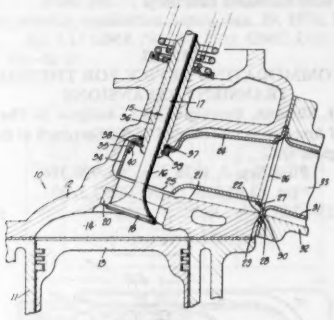
Claims priority, application Japan, Apr. 22, 1975, 50-54077[U]; Apr. 24, 1975, 50-55101[U]; Apr. 28, 1975, 50-56856[U]

Int. Cl.[2] F01N *3/10*

U.S. Cl. 60—282 **5 Claims**

1. In an internal combustion engine having an exhaust valve assembly operatively interposed between a combustion chamber and walls forming an exhaust port, the valve assembly having a poppet valve movable in a stationary guide to close against a stationary seat, the improvement comprising, in combination: an elongated exhaust port liner positioned within the exhaust port and spaced from the walls thereof, said liner being shaped for insertion into operative position through the discharge end of the exhaust port, said liner having an entrance

opening at one side through which the valve extends, said liner having a discharge opening remote from said entrance opening, a portion of the liner being provided with a slot for reception of a portion of said valve and said stationary guide, a



tongue element positioned to restrict flow of exhaust gases through said slot, means for securing said liner and said tongue element to the stationary guide, and a stationary flange contacting said walls and slidably supporting said liner adjacent its discharge opening.

4,089,164

MANIFOLD SYSTEM

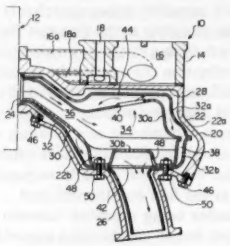
Yoshio Iwasa, Nagareyama, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed May 5, 1976, Ser. No. 683,489

Claims priority, application Japan, May 16, 1975, 50-58417; May 16, 1975, 50-58418

Int. Cl.[2] F01N *3/10*

U.S. Cl. 60—282 **1 Claim**



1. A manifold system for a multi-cylinder, internal combustion engine having a plurality of cylinders, said manifold system comprising:

an intake manifold system connectable to said plurality of cylinders to distribute an air-fuel mixture thereinto, said intake manifold system having a heat riser; and

an exhaust manifold system including

a casing having a section forming the bottom of said heat riser, said casing having a plurality of inlet ports connectable to said plurality of cylinders to receive the exhaust gases,

and an outlet port;

an inner liner mounted within said casing, said inner liner having a reaction chamber and a plurality of passages corresponding in number to said plurality of inlet ports, said passages leading from said plurality of inlet ports of said casing to said reaction chamber to direct all of the exhaust gases toward said reaction chamber; and

an outer liner mounted within said casing to jacket said inner liner, said outer liner having a jacket chamber enclosing said reaction chamber and a plurality of jacket tubes enclosing said plurality of passages of said inner liner, respectively, said plurality of jacket tubes extending outwardly from said jacket chamber to said inlet ports of said casing and being connected to said inner liner at said inlet ports of said casing, said outer liner having a heater wall which forms part of said jacket chamber and extends in spaced and opposite relation to said section of said casing so that the bottom of said heat riser is exposed to heat from said heater wall;

said inner liner being designed to direct all of the gases resulting from the reaction within said reaction chamber toward said heater wall upon discharge from said reaction chamber,

said outer liner having an aperture positioned in alignment with said outlet port of said casing, said outer liner being designed to direct all of the gases resulting from the reaction within said reaction chamber to flow through said jacket chamber toward said outlet port of said casing so that the gases flowing through said jacket chamber cover substantially all outer surface area of said reaction chamber before they flow out of said jacket chamber through said outlet port of said casing, in which said casing is divided into a first part including said section forming the bottom of said heat riser and a second part including said outlet port; in which

said inner liner is divided into a first part including a discharge port which directs all of the gases resulting from the reaction within said reaction chamber toward said heater wall and a second part including a plurality of leg portions; and in which

said outer liner is divided into a first part including said heater wall and a second part including said aperture;

said second parts of said casing, said inner liner, and said outer liner being assembled with each other by interposing an edge portion of said second part of said outer liner around said aperture between said plurality of leg portions and an edge portion of said second part of said casing around said outlet port.

4,089,165

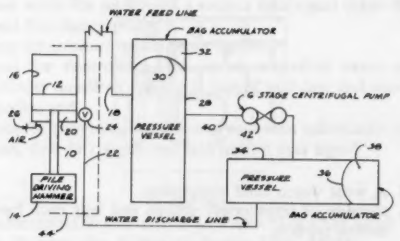
WATER PRESSURE-POWERED PILE DRIVING HAMMER

Harry W. Reineke, Jr., 6001 Dover Pl., and Floydale Teague, 2372 Comet St., both of New Orleans, La. 70114

Filed Dec. 6, 1976, Ser. No. 747,871

Int. Cl.[2] F03C *1/00*; F01L *7/00*

U.S. Cl. 60—369 **1 Claim**



1. For a drop hammer, a water-powered, cyclically operating hammer raising system comprising:

(a) an upright cylinder;

(b) a piston slidable in the cylinder;

(c) a piston rod connected to the piston and arranged for connection with the hammer;

(d) a continuously operating water pump;

(e) a first pressure vessel;

(f) a second pressure vessel;

(g) a conduit continuously communicating between the first

and second pressure vessels and incorporating the water pump in a sense to continuously pump water from the first pressure vessel into the second pressure vessel;

(h) a valve assembly including a valve housing and a valve body mounted in the valve housing for movement between a first position and a second position;

(i) a water inlet conduit through the housing to the valve body;

(j) a water outlet conduit from the valve body through the valve housing;

(k) a water feed line continuously connecting the water inlet conduit to the first pressure vessel;

(l) a water discharge line continuously connecting the water outlet conduit to the second pressure vessel;

(m) the valve body having port means which, when the valve is in said first position, communicate the water inlet conduit with the cylinder below the piston and isolate the water outlet line from the cylinder below the piston and which, when the valve is in said second position, communicate the water outlet conduit with the cylinder below the piston and isolate the water inlet line from the cylinder below the piston;

(n) means for cyclically switching the valve body between said first and second positions thereof; and

(o) first and second sealed, air-containing resilient cushion means associated with the respective first and second pressure vessels via flexible dividing wall means, so that when the respective pressure vessel is temporarily isolated from the respective water inlet or outlet conduit, the respective flexible wall may resiliently distend as the volume of contained-air correspondingly changes, and may resiliently recover, effectively aiding the pump, when the respective temporary isolation ends.

4,089,166

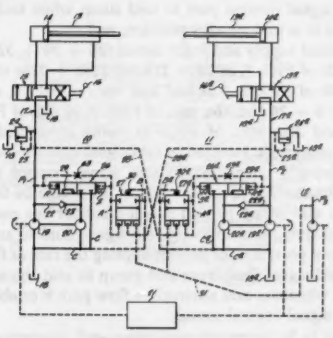
AUTOMATIC PUMP CONTROL SYSTEM

Frank W. Ratliff, and James R. McBurnett, both of Corinth, Miss., assignors to Tyrone Hydraulics, Inc., Corinth, Miss.

Continuation-in-part of Ser. No. 452,713, Mar. 20, 1974, Pat. No. 3,868,821. This application Mar. 3, 1975, Ser. No. 554,522

Int. Cl.² F15B *18/00*

U.S. Cl. 60—421 **18 Claims**



1. In a hydraulic control system of the type including a plurality of hydraulic circuits, each circuit having pump means driven by a prime mover common to all circuits for pumping hydraulic fluid from a reservoir to a hydraulically operated implement individual to its circuit, the pump means in one of said circuits comprising a plurality of pumps and means for unloading one of said pumps including a pilot valve actuator having a plurality of pressure areas, means for applying pressures prevailing in said circuits against said pressure areas, said pilot valve actuator being shiftable to a position in which said one pump is unloaded when the sum of the pressures applied to said pressure areas reaches a preselected value.

4,089,167

LOAD RESPONSIVE VALVE ASSEMBLIES

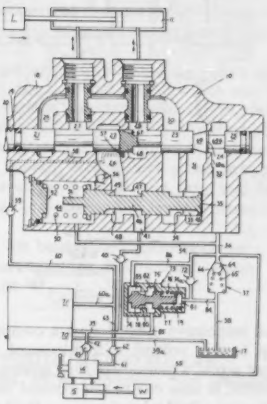
Tadeusz Budzich, 80 Murwood Dr., Moreland Hills, Ohio 44022

Continuation-in-part of Ser. No. 522,324, Nov. 8, 1974, Pat. No. 3,998,134, Ser. No. 559,818, Mar. 19, 1975, Pat. No. 3,984,979, and Ser. No. 655,561, Feb. 5, 1976. This application Jul. 27, 1976, Ser. No. 709,203

The portion of the term of this patent subsequent to Oct. 12, 1993, has been disclaimed.

Int. Cl.² F15B *13/08*

U.S. Cl. 60—427 **12 Claims**



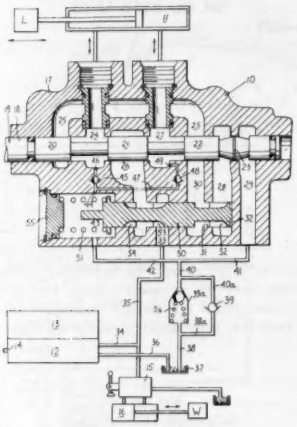
12. Multiple load responsive valve assemblies each comprising a housing having a fluid inlet chamber connected to pump means, a fluid supply chamber, at least one load chamber, outlet fluid conducting means and fluid exhaust means connected to reservoir means, first valve means for selectively interconnecting said fluid load chamber with said fluid supply chamber and said fluid exhaust means, said first valve means having first variable metering orifice means operable to throttle fluid flow between said load chamber and said fluid exhaust means and second variable orifice means operable to throttle fluid flow between said fluid supply chamber and said load chamber, load sensing port means selectively communicable with said load chamber by said first valve means, second valve means having out flow throttling means between said load chamber and said fluid exhaust means responsive to pressure upstream of said first variable orifice means, said second valve means having fluid isolating means between said fluid inlet chamber and said fluid supply chamber, fluid replenishing means to interconnect for fluid flow said fluid supply chamber and said fluid exhaust means when said fluid isolating means isolates said fluid supply chamber and said fluid inlet chamber, and control means connected to said inlet chambers of said valve assemblies, control line means interconnecting said control means with said pressure sensing port means of said valve assemblies, control signal direction phasing means in each of said control line means, said third control valve means responsive to highest pressure in any of said load chambers of valve assemblies operating loads and operable to vary fluid flow delivered from said pump means to said load system to maintain a constant pressure differential across said second variable orifice means between pressure in said inlet chambers and said maximum pressure in said load chamber.

4,089,168

LOAD RESPONSIVE FLUID CONTROL VALVES

Tadeusz Budzich, 80 Murwood Dr., Moreland Hills, Ohio 44022

Division of Ser. No. 559,818, Mar. 19, 1975, Pat. No. 3,984,979, and a continuation-in-part of Ser. No. 377,044, Jul. 6, 1973, Pat. No. 3,882,896. This application Aug. 25, 1976, Ser. No. 717,759
Int. Cl.[2] F16D *31/02*
U.S. Cl. 60—427 14 Claims



1. A load responsive control system comprising a variable flow pump having volume output control responsive to a pressure load signal, a plurality of fluid motors, a control valve for each motor, at least one of said control valves comprising a housing having a fluid inlet chamber, a fluid supply chamber, first and second fluid load chambers, a fluid outlet chamber, a fluid exhaust chamber and fluid exhaust means, first valve means for selectively interconnecting said fluid load chambers with said fluid supply chamber and said fluid outlet chamber, variable fluid metering means between said fluid exhaust chamber and said fluid exhaust means, first throttling means responsive to pressure in said exhaust chamber and operable to control fluid flow from said fluid inlet chamber to said fluid supply chamber to maintain said pressure in said fluid exhaust chamber at a first relatively constant preselected level when one of said fluid load chambers is interconnected with said fluid outlet chamber and when pressure in said outlet chamber is at said first relatively constant preselected level, and second throttling means responsive to pressure in said fluid exhaust chamber and operable to control fluid flow from said fluid outlet chamber to said fluid exhaust chamber to maintain said pressure in said fluid exhaust chamber at a second relatively constant preselected level when one of said fluid chambers is interconnected with said fluid outlet chamber and when pressure in said fluid outlet chamber is higher than said second preselected pressure level, and a load pressure signal line for transmitting a control signal from said load chamber to said volume ouput control of said variable flow pump, said control being operable to maintain a constant pressure difference between said inlet chamber and said load chamber connected thereto.

4,089,169

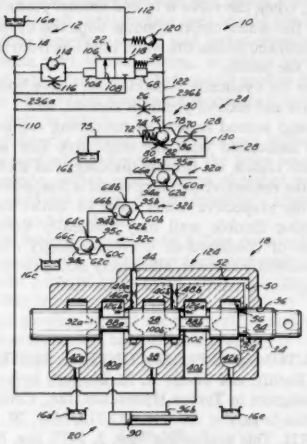
PRESSURE ACTUATED SIGNAL FLUID CONTROL FOR LOAD RESPONSIVE SYSTEMS

Wendell E. Miller, Warsaw, Ind., assignor to The Scott & Fetzer Company, Kokomo, Ind.

Filed Aug. 19, 1976, Ser. No. 716,019
Int. Cl.[2] F16H *39/46*
U.S. Cl. 60—445 44 Claims

1. In a load responsive hydraulic system of the type which includes a source (12 of FIG. 1 or 202 of FIG. 2) of pressurized fluid having a pump (14 or 204) and a sump (16 or 206), a fluid actuated device (20), a directional control valve (18) having a movable valving element (34) and having both an operating position wherein fluid from said pump is supplied to said fluid actuated device at the load actuating pressure thereof and a standby position wherein said fluid actuated device is isolated from said pump, a fluid responsive means (22 or 208, where 208 = 210 + 212) having a signal chamber (68 or 232) therein and being effective to control the pressure and effective output of said pump in response to the pressure magnitude of a signal fluid supplied to said signal chamber, the improvement which comprises:

signal control means, including a signal control port (44) in said control valve and including cooperating portions (58, 54, and 84) of said valving element, for establishing a load sensing flow path (126*a* or 126*b*) which communicates said signal control port with said fluid actuated device to sense said load actuating pressure when said control valve is in said operating position, and for establishing an attenuation



flow path (56) which communicates said signal control port with said sump (16*e*) to attenuate the fluid pressure in said signal control port to said sump when said control valve is in said standby position; and

signal fluid supply and logic means (26 + 30 + 32*a* + 32*b* + 32*c* of FIG. 1, or 26 + 214*a* + 214*b* + 214*c* of FIG. 2, or 400 of FIG. 5 + 26 and 32*a*, etc., of FIG. 1, or 452 of FIG. 6 + 26 and 32*a*, etc., of FIG. 1, or 470 of FIG. 7 + 26 and 32*a*, etc., of FIG. 1), being connected to said source, being connected to said signal chamber, and being operatively connected to said signal control port, for continuously supplying a limited flow rate of fluid flow from said pump to said signal chamber for use as said signal fluid, for supplying said signal fluid to said signal control port, and for further limiting the rate of fluid flow of said signal fluid from said pump to said signal control port whenever said attenuation flow path is established by said signal control means.

4,089,170

POWER CONSERVATION MEANS FOR VARIABLE DISPLACEMENT PUMP FLUID SUPPLY SYSTEM

Howard L. Johnson, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 9, 1977, Ser. No. 795,032
Int. Cl.[2] F16H *39/46*
U.S. Cl. 60—445 10 Claims

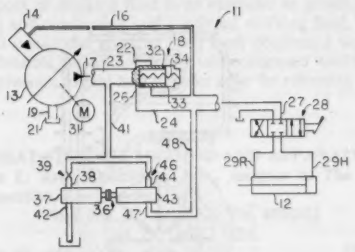
1. A pressurized fluid supply system for fluid-operated mechanism comprising:

a variable displacement pump having an inlet connected to a source of fluid and having a pressurized fluid outlet, said

variable displacement pump further having a compensator which responds to a signal pressure by decreasing pump displacement when the signal pressure rises and by increasing pump displacement when the signal pressure drops,

a flow control valve having an open position for admitting pressurized fluid to said fluid-operated mechanism, and having a closed position,

a check valve having an inlet and an outlet,



first flow line means communicating said variable displacement pump outlet with said inlet of said check valve, and second flow line means communicating said outlet of said check valve with said flow control valve,

signal line means for transmitting fluid pressure from said second flow line means to said compensator, and

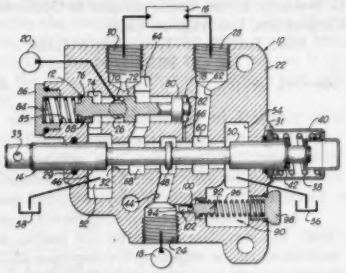
means for raising the pressure in said second flow line means above the pressure in said first flow line means when said flow control valve is closed.

4,089,171

FOUR POSITION VALVE ASSEMBLY

Glenn R. Hubbard, Racine, Wis., assignor to Webster Electric Company, Inc., Racine, Wis.

Filed May 24, 1976, Ser. No. 689,573
Int. Cl.[2] F16D 31/02
U.S. Cl. 60—486 **3 Claims**



1. An apparatus for controlling the speed of at least one motor or the like by selectively controlling the fluid flow from first and second fluid sources to said motor comprising:

a housing;

a first elongated bore in said housing;

a first movable valve slideably mounted in said first bore;

a first passage in said housing for communicating said first fluid source to said first bore;

a second passage in said housing communicating said first bore with said motor;

a third passage in said housing communicating said first bore with said meter;

a second bore in said housing said second bore in fluid communication with said second source and said third passage;

a fourth passage communicating said first and second bores with a fluid reservoir;

a pressure sensitive, movable valve mounted in said second bore for controlling fluid flow from said second source to said motor;

said pressure sensitive valve including means for controlling fluid flow from said second fluid source to one of said third and fourth passages;

said pressure sensitive valve including a pressure surface for interacting with fluid;

a pilot passage communicating said pressure surface with said first bore;

said first valve being slidable to a first position to direct a portion of said fluid from said first source to said pilot passage to actuate said pressure sensitive valve to a second position communicating said second source with said third passage;

said pressure sensitive valve comprises a pilot spool valve including at least one land against which said fluid from said second source acts and a passage in said land for communicating said fluid from said second source to a portion of said second bore adjacent said land thereby providing a varying biasing force acting in opposition to the force developed by said fluid from said first source acting on said pressure surface on said pressure sensitive valve; and

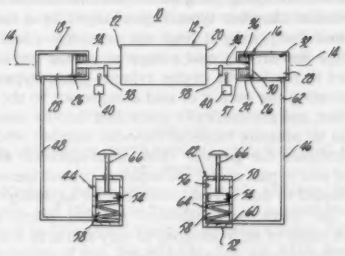
biasing means for biasing said pilot spool valve to a first position communicating said second source with said fourth passage.

4,089,172

POSITION CONTROLLER

David W. Junttila, 50794 Jefferson, New Baltimore, Mich. 48047

Filed Oct. 13, 1976, Ser. No. 731,998
Int. Cl.[2] B60T 7/00
U.S. Cl. 60—567 **5 Claims**



1. A device for positioning a controlled member along an axis of movement comprising;

a first and second hydraulic actuator, each actuator comprising a tubular cylinder closed at one end and a piston axially slidably disposed in each of said cylinders and defining a working chamber in its respective cylinder between the piston and the closed end of said cylinder, said cylinders being positioned coaxially and on opposite axial ends of said member and in an oppposed relationship,

a pair of piston rods, each piston rod being connected at one end to one of said pistons and at its other end to the adjacent axial end of said member,

a third and fourth hydraulic actuator, said third and fourth actuators comprising a tubular cylinder closed at one end and a piston axially slidably disposed in each of said last mentioned cylinders and defining a working chamber between each of said last mentioned pistons and the closed end of said last mentioned cylinders,

a pair of manually operated handles, each handle being secured at one end to one of said last mentioned pistons and operable to axially displace its respective last men-

tioned piston whereby the volume of each of said last mentioned working chambers varies proportionately and uniformly with the axial displacement of said pistons by said handles, and

a first fluid conduit for fluidly connecting said third actuator working chamber only to said first actuator working chamber and a second fluid conduit for fluidly connecting said fourth actuator working chamber only with said second actuator working chamber,

all of said working chambers and said conduits being filled with an incompressible fluid whereby an axial displacement of one of said third and fourth actuator pistons causes an equal but opposite axial displacement of the other third or fourth actuator piston.

4,089,173

SUPERCHARGED INTERNAL COMBUSTION ENGINES

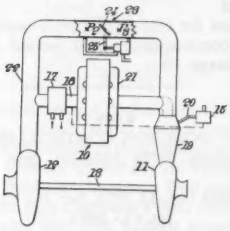
Jean Melchior, and Thierry André, both of Paris, France, assignors to Etat Francais, Paris, France

Filed Sep. 22, 1975, Ser. No. 615,775

Claims priority, application France, Apr. 24, 1975, 75 12742

Int. Cl.² F02D 23/00

U.S. Cl. 60—606 **17 Claims**



1. A power unit comprising an internal combustion engine of the expansible chamber type, supercharged by a turbocompressor unit comprising at least one compressor and at least one turbine for driving said compressor, said turbine being connected to receive the engine exhaust gases, bypass means communicating the output of said compressor to the inlet of said turbine, and automatically controlled throttle means comprising an air pressure balanced movable member whose position determines the gaseous flow cross-sectional area in a section of said bypass means and separate control means operatively coupled to said movable member for adjusting the position of the latter, said balanced member being movable through a range of such positions to vary said area in a manner such that the pressure drop produced in said bypass means is an increasing function of the pressure in said bypass means and said pressure drop is substantially independent of the gaseous flow rate through said bypass means.

4,089,174

METHOD AND APPARATUS FOR CONVERTING RADIANT SOLAR ENERGY INTO MECHANICAL ENERGY

Mario Posnansky, Pappelweg 4, 3072 Ostermundigen, (Canton of Berne), Switzerland

Filed Mar. 10, 1975, Ser. No. 556,590

Claims priority, application Switzerland, Mar. 18, 1974, 3711/74

Int. Cl.² F03G 7/02

U.S. Cl. 60—641 **8 Claims**

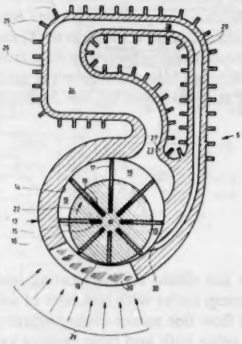
1. Apparatus for converting solar energy into mechanical energy comprising:

a. a reflector means for concentrating radiant solar energy in a predefined area;

b. a device for directly converting said solar energy into mechanical energy by means of a closed cycle expansion of a fluid heated by direct radiation from solar energy, said device including,

c. a housing having a portion of its area transparent to solar energy, said portion located in said predefined solar energy concentration area;

d. a series of axially mounted rotatable reciprocally movable side walls forming a plurality of chambers with said housing; two of said walls forming an energy active chamber with said transparent housing area;



e. inlet means for continuous introduction of the fluid in said chamber including said transparent area; and

f. exhaust means for removal of that portion of the fluid which has been expanded in said chamber having said transparent area with said exhaust means interconnected with said inlet means to provide a closed system; said system allowing for continuous output of mechanical energy without provision of an energy storage means as long as solar energy is provided to activate the system.

4,089,175

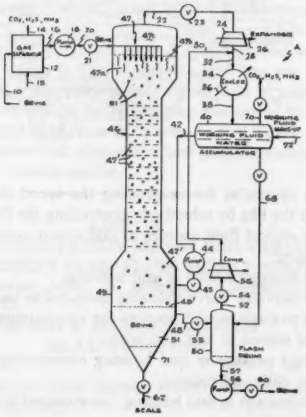
PROCESS AND SYSTEM FOR RECOVERY OF ENERGY FROM GEOTHERMAL BRINES AND OTHER WATER CONTAINING SOURCES BY DIRECT CONTACT WITH A WORKING FLUID BELOW THE CRITICAL PRESSURE

Samuel G. Woinsky, Irvine, Calif., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.

Filed Jun. 23, 1975, Ser. No. 611,310

Int. Cl.² F03G 7/00

U.S. Cl. 60—641 **49 Claims**



1. Process for recovery of energy from elevated temperature or hot water containing fluids including geothermal brines and

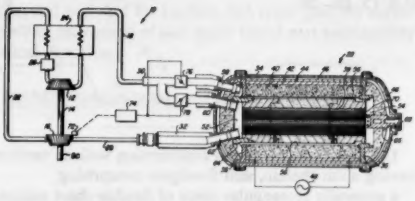
other elevated temperature water sources, which comprises introducing said water containing fluid in a heat transfer zone in heat exchange relation therein with a working fluid in liquid form, and heating said working fluid at temperature to produce boiling thereof in the upper portion of said heat transfer zone, said heat transfer zone being maintained at a pressure below the critical pressure of said working fluid, and corresponding to operation at a point on the saturated vapor curve of the Mollier enthalpy-entropy diagram for said working fluid, close to the apex on said saturated vapor curve, expanding the boiling vapors of working fluid in an expander to produce work, cooling and condensing said expanded working fluid, separating said condensed working fluid from condensed water and uncondensible gas, and returning said condensed working fluid under pressure to said heat transfer zone for reheating therein.

4,089,176

HEAT STORAGE METHOD AND APPARATUS

Thomas L. Ashe, Scottsdale, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Jan. 20, 1976, Ser. No. 650,822
Int. Cl.[2] F02C *1/04*
U.S. Cl. 60—650 **17 Claims**



1. Power turbomachinery, comprising:
a compressor for compressing a working fluid;
a turbine driven by the compressed working fluid to produce a mechanical power output;
a pair of operably parallel passages for carrying fluid from said compressor to said turbine;
a noncombustion heat storage element cooperating with one of said passages for heating the working fluid therein being delivered from said compressor to said turbine whereby the compressed, heating working fluid expands across said turbine to drive the latter and the temperature of working fluid delivered to said turbine is dependent upon the ratio of fluid flowing through said pair of passages;
means adapted to be connected to a source of electrical energy for preheating said storage element by electromagnetic induction, said storage element comprising a solid, carbonaceous, foraminated body which is subject to continuing loss of stored heat as it heats fluid in said one of the passages subsequent to said preheating; and
control means for adjusting said ratio of fluid flowing through said pair of passages to accommodate for the continuing loss of heat from said storage element as the latter heats fluid in said one of the passages.

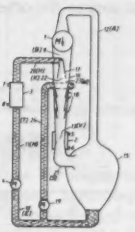
4,089,177

HEAT ENGINE FOR TRANSFORMING HEAT ENERGY TO WORK INCLUDING EJECTOR HEAT PUMP

Gosta Olofsson, Sannagatan 15, 68100 Kristinehamn, Sweden

Filed Sep. 8, 1976, Ser. No. 721,501
Claims priority, application Sweden, Dec. 22, 1975, 7500615
Int. Cl.[2] F01K *21/00*
U.S. Cl. 60—688 **4 Claims**

1. A heat engine for transforming heat energy into mechanical work by circulating a working medium within a closed system, said heat engine comprising
a means for transforming heat energy in a working medium into mechanical work, said means including a working medium inlet and a working medium outlet, the working medium undergoing an expansion and a temperature decrease while passing through said transforming means;
a compressor means connected to the working medium outlet of said transforming means, said compressor capable of increasing the pressure of said work medium passing therethrough;
a cooler means connected to said compressor means, said cooler means capable of cooling a portion of said working medium passing therethrough into liquid form;
a separator means connected to said cooler means capable of separating the liquified working medium from the non-liquified working medium delivered from said cooler means;



means for delivering the non-liquified working medium from said separator means to said working medium inlet of said transforming means;
means for delivering the liquified working medium from said separator means to said compressor means;
means in said means for delivering the liquified working medium from said separator means to said compressor means for increasing the temperature and pressure of said liquified working medium; and
said compressor means comprising an ejector including an envelope and a discharge nozzle within said envelope, said means for delivering the liquid working medium from said separator means to said compressor means being connected to said nozzle.

4,089,178

APPARATUS FOR DEPLOYING AND TAKING UP AN OIL FENCE

Takeo Kinase; Isamu Yano; Kanichi Okubo; Hidetoshi Kitakoga, and Hiromitsu Tayama, all of Sagamihara, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

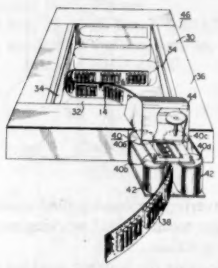
Continuation of Ser. No. 443,131, Feb. 15, 1974, Pat. No. 3,971,220. This application Jun. 18, 1975, Ser. No. 587,871
Claims priority, application Japan, Feb. 23, 1973, 48-23420[U]; Aug. 30, 1973, 48-101721[U]; Dec. 12, 1973, 48-144152[U]
Int. Cl.[2] E02B *15/04*
U.S. Cl. 61—1 F **2 Claims**

1. An apparatus for deploying and taking up an oil fence, comprising:
buoyant side walls jointly comprising a buoyant frame having an interior oil fence receiving space for storing therein an elongated flexible buoyant oil fence having a major width dimension and a minor thickness dimension and which floats with its width dimension generally vertical when deployed in use in water, said buoyant side walls defining a lateral periphery of the oil fence receiving space and extending around the periphery of the oil fence receiving space for protecting the oil fence when it is stored within the oil fence receiving space, said buoyant side walls having a height greater than the width dimension of the oil fence to permit storage of the oil fence with its width dimension vertical, one of said buoyant side walls having an opening therethrough dimensioned to permit

the oil fence to be advanced therethrough with its width dimension vertical for deploying it from and taking it up into the oil fence receiving space in use, and said buoyant further comprising a bottom plate-like member attached to said side walls and defining a lower periphery of the oil fence receiving space; and

guide means mounted on said one of said buoyant side walls proximate the opening through said one of said buoyant side walls for guiding the oil fence and for maintaining its width dimension vertical as it is deployed and taken up through the opening, wherein said guide means comprises;

a first pair of spaced rollers having respective parallel axes of rotation, and a first taut endless belt wound about a respective surface portion of each of the rollers and spanning the space between the first pair of rollers so that rotation of one of the rollers of the first pair advances the first belt and rotates the other roller of the first pair of rollers;



a second pair of spaced rollers having respective parallel axes of rotation, and a second taut endless belt wound about a respective surface portion of each of the rollers of the second pair and spanning the space between the second rollers so that the rotation of one of the rollers of the second pair advances the second belt and rotates the other roller of the second pair of rollers; and

means mounting said first pair and second pair of rollers with their respective axes of rotation vertical and with their respective belts opposed and spaced to define therebetween a narrow vertical opening for receiving the oil fence with its width dimension vertical and with the oil fence sandwiched between the respective belts and making frictional contact therewith, whereby rotation of one of said rollers advances a respective one of said belts which thereby advances the oil fence between the pair of opposed belts when it is in frictional contact therewith.

4,089,179

SHORELINE EROSION CONTROL

Frank A. Trautman, 1448 Bishop St., Benton Harbor, Mich. 49022

Continuation-in-part of Ser. No. 741,846, Dec. 27, 1976, abandoned. This application May 25, 1977, Ser. No. 800,195

Int. Cl.[2] E02B *3/04*

U.S. Cl. 61—3 **3 Claims**

1. A shoreline erosion control device, comprising:

a frame fixed to the ground along the shoreline of a body of water and in the path of the wave action on the body of water; and

a plurality of selected screened louvers releasably pivotally secured to said frame and being pivotal to the open position on the side of the frame facing away from the body of water during movement of a wave therepast, each of said plurality of screened louvers consisting of a selected mesh, the size of the openings therein being selectively controlled to strain sand particles and effect the building up of sand particles of a predetermined size, a return of the water in the wave toward the lake effecting a closing of the screened louver so that any sand that will be contained in the returning water will be strained by the screened louvers, the slightly restrictive openings in the mesh of said screen slowing the water velocity and allowing the large grains of sand and soil to fall on the landward side of the screened louvers and due to the slowing of the wave action the sand particles that pass through the screen to fall on the seaward side of the device thus creating a gentle slope to the bottom.

4,089,180

LONG-LIFE FLOODGATE

Norman B. McCreary, 45 Lakeshore Dr., Little Rock, Ark. 72204

Filed Jul. 12, 1977, Ser. No. 815,001

Int. Cl.[2] E02B *7/20*

U.S. Cl. 61—29 **9 Claims**

1. A floodgate for use in combination with an earthen levee having a cut therein, said floodgate comprising

a generally rectangular piece of flexible sheet material having a sufficient length to pass from the bottom of one side of the levee, over the crown of the levee, to the bottom of the other side of the levee, and having a sufficient width to extend completely across the width of the cut in the levee and a substantial distance on either side of the cut in the levee, so that in a flow-passing position of the floodgate, the sheet material completely lines the cut in the levee;

an elongated relatively rigid freely movable pole having a length greater than the width of the cut in the levee, and having a cross-sectional area;

a loop formed in the piece of sheet material along one end thereof, generally across the width thereof, the loop having a void area encompassed thereby at least as great as the cross-sectional area of said pole so that said pole may be rotated to wrap the sheet material around the pole while the pole is received by the loop; and

the edge of said sheet opposite said loop being buried underground on the high water side of the levee, and the edges of said sheet adjacent said edge opposite the edge of said sheet having said loop, being buried along the length thereof up to approximately the crown of the levee, and being free from the crown of the levee toward the low water side of the levee.

4,089,181

CANOPY AND SHIELD STRUCTURE FOR SUPPORTING A SHIELD IN A SEAM-LIKE MINE DEPOSIT

Manfred Koppers, Duisburg, Germany, assignor to Thyssen Industrie AG, Germany

Filed Mar. 7, 1977, Ser. No. 775,197

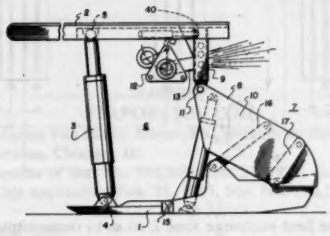
Claims priority, application Germany, Apr. 17, 1976, 2617141

Int. Cl.[2] E21F *5/06*

U.S. Cl. 61—45 D **2 Claims**

1. A canopy and shield structure for supporting a shield adjacent a working face in a seam-like mine deposit with a roof stratification, comprising a floor skid, a roof canopy overlying said skid having a working end and adapted to extend up to the

working face of the mine deposit and having an opposite end extending away from the face, a fluid pressure-operated extensible and retractable prop having an upper end pivotally connected to said roof canopy adjacent the operating face end and an opposite end pivotally connected to said skid, and a shield extending between the opposite end of said roof canopy and said floor skid and including a lower part having a lower end



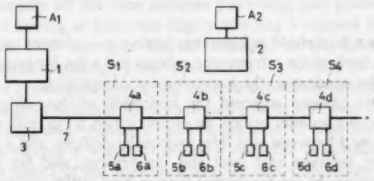
pivotally connected to said floor skid and having an opposite upper end, and an upper shield part rigidly connected to said roof canopy adjacent said opposite end of said roof canopy and also connected to said upper end of said lower shield part, and a lemniscate linkage guide means connected between said lower part and said skid for guiding said upper part for movement to effect movement of said upper shield part substantially in a vertical direction.

4,089,182

EQUIPMENT FOR REMOTELY OPERATING SELF-ADVANCING SUPPORTS USED AT THE PIT FACE IN A COAL MINE

Ken Takahashi, and Hideo Inoue, both of Tokyo, Japan, assignors to Taiheiyo Engineering Inc., Tokyo, Japan

Filed Dec. 15, 1976, Ser. No. 750,752
Claims priority, application Japan, Jul. 31, 1976, 51-91488
Int. Cl.² E21D *15/44*
U.S. Cl. 61—45 D **10 Claims**



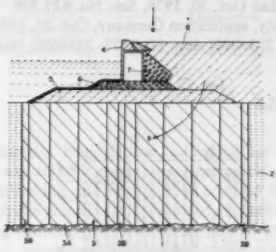
1. Apparatus for operating self-advancing mine roof supporting systems which includes a plurality of support plate means each operated by hydraulic cylinder means for vertically moving and advancing the support plate means, the combination comprising a plurality of electromagnetic valves controlling the operation of said hydraulic cylinder means, a signal converter receiver operable to receive signals transmitted from a remote portable transmitter, and interconnecting means interconnecting said electromagnetic valves and said signal converter receiver such that the electromagnetic valves are remotely operated by said portable transmitter which transmits signals to said signal converter receiver which in turn effects operation of said electromagnetic valves through said interconnecting means.

4,089,183

CONSOLIDATION CONSTRUCTION FOR IMPROVING SOFT, UNSTABLE FOUNDATION

Masaaki Endo, Omiya; Mitsuo Miura, and Yoshinori Kukino, both of Tokyo, all of Japan, assignors to Kabushiki Kaisha Takenaka Komuten, Osaka and Kabushiki Kaisha Takenaka Doboku, Tokyo, both of, Japan

Filed Sep. 24, 1976, Ser. No. 726,204
Int. Cl.² E02D *3/12*
U.S. Cl. 61—50 **7 Claims**



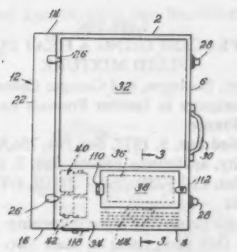
1. Consolidation construction for improving soft, unstable foundation, formed by admixing hardening agent therein; comprising a large number of consolidated walls juxtaposed one after another, each extending along the direction coinciding with the direction in which the maximum sliding, shearing rupture stress appears under the gravity load of the superstructure built on the soft, unstable foundation improved by this consolidation construction, said walls being connected together by a mixture of said hardening agent and the said soft unstable foundation which covers said consolidation and a portion of said foundation, thereby ensuring sufficiently improved bearing strengths both for the vertical gravity load and for the sliding, shearing rupture stress.

4,089,184

HAND CASE

Shlomo Beitner, Tel-Aviv, Israel, assignor to Bipol Ltd., Tel-Aviv, Israel

Filed Jul. 26, 1976, Ser. No. 708,571
Int. Cl.² F25B *21/02*
U.S. Cl. 62—3 **18 Claims**



1. A hand case having a cooling compartment which comprises side and bottom walls and a cover; a main compartment, an auxiliary compartment, and an insulated compartment between said main compartment and said auxiliary compartment; a thermoelectric element having a cold face and a hot face arranged with the cold face in heat-transfer with the interior of said insulated compartment and with its hot face in heat-transfer with the air in said auxiliary compartment; and grill means in said auxiliary compartment permitting the inflow and outflow of air in and out of said auxiliary compartment; said auxiliary compartment being L-shaped, with one leg of said L

housing a heat-dissipating means for effecting the heat-transfer from said hot face to the air in said auxiliary compartment, and the other leg thereof housing batteries for energizing said thermoelectric element.

4,089,185

HIGH VACUUM PUMP SYSTEM

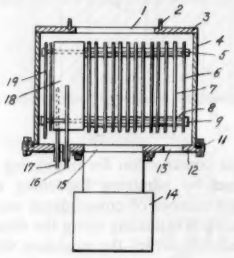
Josef Kemmer, Garching, Germany, and Eckhard Kellner, No. 14, Obere Dorfstrasse, 8061 Viehbach, Germany, assignors to Eckhard Kellner, Viehbach, Germany, a part interest

Filed Oct. 30, 1975, Ser. No. 627,398

Claims priority, application Germany, Oct. 31, 1974, 2451717; Aug. 13, 1975, 2536006; Aug. 13, 1975, 2536005; Nov. 25, 1974, 2455712

Int. Cl.[2] B01D *5/00*

U.S. Cl. 62—55.5 **18 Claims**



1. A high vacuum pumping system comprising a forepump and a cryo-sorption pump, said cryo-sorption pump comprising

(a) a closed vessel;

(b) means for connecting said vessel to a container to be evacuated and said forepump and means detachably connecting said vessel to a cooling device;

(c) a reservoir for liquid nitrogen, a plurality of plates and heat conductive means detachably mounting said plates in spaced relationship on said reservoir, said reservoir, plates and mounting means being contained in said vessel; and

(d) the surfaces of said plates being coated with a sorbent selected from the group consisting of zeolite, alumina, active charcoal and mixtures thereof secured to said plates by a water glass bonding agent.

4,089,186

HEATING PROCESS USING A HEAT PUMP AND A FLUID MIXTURE

Alexandre Rojey, Boulogne, and Georges Cohen, Le Pecq, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

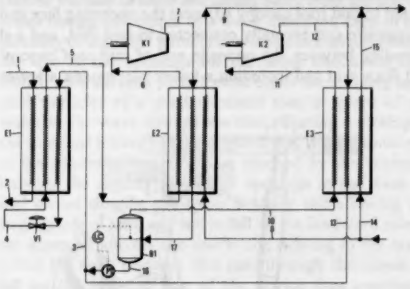
Filed Jan. 5, 1977, Ser. No. 756,838

Claims priority, application France, Jan. 7, 1976, 76 00390

Int. Cl.[2] F25B *15/00, 27/02, 1/00*

U.S. Cl. 62—101 **21 Claims**

1. A process for producing heat comprising: (a) vaporizing a liquid mixture (M) comprising at least two components of different boiling points forming no azeotrope with one another under the vaporization conditions, called working fluid, in a temperature range A above 0° C and below 100° C, by taking at least the major portion of the vaporization heat from a first external fluid acting as heat source, in a countercurrent heat exchange zone I, (b) compressing at least a portion of the obtained vapor in a compression zone, (c) condensing at least a portion of the compressed vapor in a temperature range B above 40° C, while transferring at least the major part of the heat of condensation to a second external fluid in a heat exchange zone II, the highest temperature in the temperature range B being higher than the highest temperature in the temperature range A and, (d) withdrawing at least a portion of the obtained liquid fraction (N), expanding the same and feeding it



back to the heat exchange zone I, so as to reconstitute at least a portion of the working fluid (M).

4,089,187

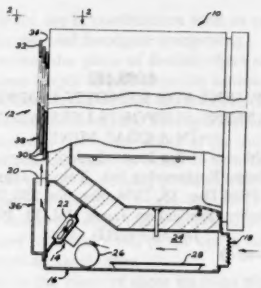
CONDENSER-AIR FLOW SYSTEM OF A HOUSEHOLD REFRIGERATOR

Frank A. Schumacher, and Earl H. Magester, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Continuation-in-part of Ser. No. 589,409, Jun. 23, 1975, abandoned. This application Mar. 17, 1977, Ser. No. 778,630

Int. Cl.[2] F25B *39/04*

U.S. Cl. 62—289 **13 Claims**



1. In a household refrigerator having a condenser mounted on the back of the refrigerator cabinet and a fan for passing air over the condenser, the improvement comprising:

an air channel adjacent the underside of the refrigerator having an inlet orifice, an outlet orifice, a fan orifice positioned between said inlet and outlet orifices, and a chamber between said inlet and fan orifices, said fan orifice having the fan positioned therein, said outlet orifice being directed toward the condenser, and said chamber being of a sufficient size between the inlet orifice and the fan orifice for maintaining the rate of air flow therethrough at a velocity sufficiently low for causing a substantial volume of foreign substances entering the chamber to settle out of the air flow and be maintained in said chamber so as not to clog up the condenser.

13. In a household refrigerator having a condenser with a plurality of tubes and a fan for passing air over the condenser, the improvement comprising:

an air channel having an inlet orifice, an outlet orifice, a fan orifice positioned between said inlet and outlet orifices, and a chamber between said inlet and fan orifices, said fan orifice having the fan positioned therein, said outlet orifice being directed toward the condenser, and said chamber being of a size sufficient for maintaining the rate of air

flow therethrough at a velocity sufficiently low for causing a substantial volume of foreign substances entering the chamber to be maintained in said chamber;

the condenser tubes being free of protuberances; and

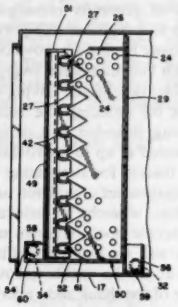
each of the condenser tubes being generally vertically and horizontally spaced from an adjacent tube.

4,089,188

EVAPORATOR COIL

Edward James Van Laeys, Dover, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 591,249, Jun. 27, 1975, abandoned.
This application Feb. 18, 1977, Ser. No. 770,153
Int. Cl.[2] F25D *21/14*
U.S. Cl. 62—290 **1 Claim**



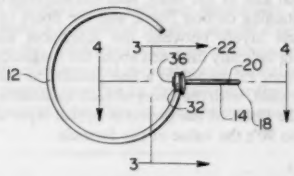
1. An evaporator coil assembly for use in an air conditioning system of the type in which the evaporator coil assembly is located within a housing through which air to be conditioned is caused to flow through said coil assembly comprising: an evaporator coil including a plurality of tube sections lying in planes which extend perpendicular to the direction of air flow; a plurality of plate-like fins each lying in a plane parallel to the direction of air flow and being in heat exchange contact with substantially all the tube sections traversing said plane, each said fin having at least one edge providing V-shaped tapered portions with the apex thereof arranged at the lowermost condensate discharge point of each fin; a plurality of spaced parallel condensate-collecting troughs extending substantially the length of said coil portions of said evaporator, said troughs underlying said V-shaped tapered portions of said fins, each trough having a width to underlie only the condensate discharge points of the adjacent fins to collect condensate gravitating from the fins while reducing interference with the flow of air through said passage to a minimum, and a pan extending across one side of said coil assembly, said pan being disposed at substantially a right angle to the plane in which said troughs lie to provide an end wall of the assembly when said assembly is oriented with the airflow in a vertical direction and to provide a bottom wall when said assembly is oriented with the airflow in a horizontal direction, said pan having a first upturned side wall, a bottom wall, a second upturned side wall, and a stepped portion adjacent said second side wall lying below said bottom wall and forming a channel, a first drain connection communicating with said channel and a second drain connection through said first side wall above the plane of said bottom wall, whereby said second drain connection provides an overflow path in the event a malfunction occurs in association with said first drain connection.

4,089,189

PIERCED EARRING WITH NON-ALLERGENIC PORTIONS FOR CONTACTING THE EAR

Henry A. Verducci, 52 Zella St., Providence, R.I. 02908

Filed May 23, 1977, Ser. No. 799,752
Int. Cl.[2] A44C *7/00*
U.S. Cl. 63—12 **11 Claims**



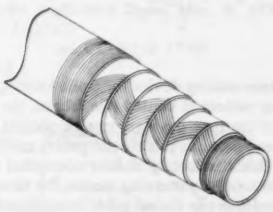
1. An earring construction including an ear ornament formed of any suitable material and an earring post attached thereto and having one end thereof adapted for receipt into and through the pierced ear opening of a wearer for support of said earring therefrom, said post formed of a non-allergenic material and positioned with respect to said ornament so as to outwardly extend from a generally planar portion thereof, means for preventing said ornament from contacting the ear lobe during wear, including a sleeve separate from said ornament and not forming a part thereof, said sleeve being generally disc shaped and also formed of a non-allergenic material and having a generally centrally disposed opening for receipt of said post and friction means for engaging said post, said sleeve positioning on said post proximate said planar portion of said ornament, portions of said sleeve extending towards peripheral portions of said ear ornament planar portion, said sleeve of an overall dimension being no greater than said planar portion of said ornament such that said planar portion substantially conceals such sleeve from view; said sleeve adapted to be disposed between said ornament and those portions of the wearer's ear adapted for positioning adjacent thereto so as to effectively shield such planar portion, which is not necessarily formed of non-allergenic materials, from contact with such ear portions.

4,089,190

CARBON FIBER DRIVE SHAFT

Gordon Peter Worgan, and Derek Reginald Smith, both of Bristol, England, assignors to Union Carbide Corporation, New York, N.Y.

Filed Apr. 14, 1976, Ser. No. 676,856
Int. Cl.[2] F16C *1/00*
U.S. Cl. 64—1 S **37 Claims**



1. A tubular drive shaft having noise and vibration dampening characteristics, and capable of being rotated at a speed of at least 6000 rpm. without misalignment between its geometric axis and its axis of rotation, said shaft having a maximum longitudinal Young's modulus of elasticity of 8×10^6 psi. and comprising a composite of a plurality of layers of filamentary material in a solid resin matrix, said filamentary material being at least 20 percent by weight carbon fibers, with from at least 10 percent by weight to no more than 20 percent by weight of the filamentary material present being disposed parallel to the

longitudinal axis of said shaft when filamentary material having a Young's modulus below 25×10^6 psi. is employed, the balance of said filamentary material being circumferentially and helically disposed about the longitudinal axis of the shaft, the fibers in the innermost and outermost layers being substantially circumferentially disposed about the longitudinal axis of the shaft at an angle of from 85° to 90° to a line parallel to the longitudinal axis of the shaft, said circumferentially disposed fibers containing carbon fibers, and the fibers of at least four intermediate layers between the innermost and outermost layers being helically disposed about the longitudinal axis at an angle of from 15° to 50° to a line parallel to the longitudinal axis of the shaft, with the fibers of each successive helical layer crossing the fibers of the previous helical layer at an angle of from 30° to 90°; the value of the formula

$$EI/L^4$$

for said shaft being no greater than 1, and the value of the formula

$$EI/L^4DPt$$

for said shaft being at least 40, wherein

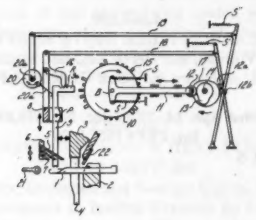
E is the longitudinal Young's modulus of the shaft (psi.),
I is the second moment of area of the shaft (inches^4),
L is the length of the shaft (inches),
D is the mean diameter of the shaft (inches),
P is the average density of the shaft wall (lb./in.^{3}), and
t is the thickness of the shaft wall (inches).

4,089,191

PATTERNING APPARATUS FOR KNITTING MACHINES, PARTICULARLY FOR MANUFACTURING PATTERNED KNITTED PILE FABRICS ON CROCHETTING MACHINES

Heinz Lindner, Geyer, Erzg., Germany, assignor to VEB Wirkmaschinenbau Karl-Marx-Stadt, Karl-Marx-Stadt, Germany

Division of Ser. No. 678,333, Apr. 19, 1976, Pat. No. 4,031,717.
This application Apr. 18, 1977, Ser. No. 789,600
Int. Cl.[2] D04B *23/06, 23/08, 23/10, 23/12*
U.S. Cl. 66—84 R **1 Claim**



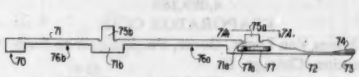
1. In a pattern-making device for a pile knitting machine for manufacturing patterned knitted pile fabrics, the knitting machine being of the type having a row of needles which move fore and aft and multiple pile thread guides movable between the needles, thread selecting sinkers controlled according to the desired pattern by patterning means, the thread exit openings of said multiple pile thread guide being disposed in a plane substantially parallel to the longitudinal axes of the needles, the improvement comprising means mounting the thread selecting sinkers for vertical movement perpendicular to the longitudinal axes of the needles, said mounting means including means for pivotal movement of the thread selecting sinkers intermediate the ends thereof about axes parallel to the row of needles, varying pattern spacer means positioned adjacent the thread selecting sinkers and constituting means for moving said thread selecting sinkers about their pivotal mounting means and for positioning the lower ends of said thread selecting sinkers adjacent any selected one thread exit opening of the multiple pile thread guide, and means for locking the thread selecting sinkers in a respective selected position relative to the corresponding exit openings of the multiple pile thread guides.

4,089,192

KNITTING MACHINE NEEDLES WITH IMPROVED CUT-OFF AND SPRING LOCATION

Alfred O. Kohorn, 862 Wycoff Ave., Brooklyn, N.Y. 11227

Filed Apr. 30, 1976, Ser. No. 681,951
Int. Cl.[2] D04B *35/04*
U.S. Cl. 66—123 **4 Claims**



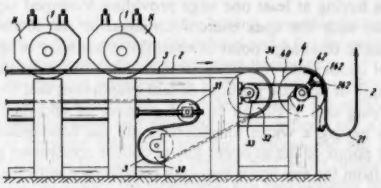
1. For use in a high speed circular knitting machine having a dial and cylinder provided with needle grooves and cams for moving the needle in said grooves, a needle comprising a flat sheet metal shank of generally rectangular transverse cross section and having an integral needle portion extending therefrom, the needle shank having a groove-contacting back and a front provided with butt means for engagement with cams of the knitting machine, said needle having cut-out means at the back of the shank for reducing the back contact area, said cut-out means being bounded and defined by substantially straight edges oriented at up to approximately ninety degrees to edges adjacent thereto for attenuating vibrations generated in said shank by engagement of said butt means with the cam of the knitting machine, whereby to reduce the transmission of vibrations to the needle hook, wherein said butt means comprises plural butts, and a spring carried by said shank for engaging the side wall of the needle groove, said spring being located on the side of the shank and underlying the butt closest to the hook.

4,089,193

MACHINE FOR PRINTING ON TEXTILE WEBS

Mathias Mitter, Verl-Sande-Mitte, Germany, assignor to Mitter & Co., Schloss Holte, Germany

Filed Jun. 24, 1974, Ser. No. 482,471
Claims priority, application Germany, Jun. 25, 1973, 2332153
Int. Cl.[2] F26B *13/18, 13/30;* **B41F** *23/04*
U.S. Cl. 68—5 D **16 Claims**



1. In a machine for printing on textile webs, a combination comprising advancing means for advancing a textile web in a path; printing means for printing onto the advancing web; suction means arranged below the advancing textile web downstream of said printing means comprising a turnably mounted hollow perforate drum, and a suction nozzle mounted in said drum having a nozzle aperture extending along an inner peripheral surface of said drum over a portion of arc, said suction means exerting suction through said textile web and supportingly engaging the same from below; a hood opposite said drum and having an open side facing the same so that said web must travel past said open side; and means for admitting treating fluid into said hood so that such fluid is drawn by said suction nozzle through said web.

6. In a machine for printing on textile webs, a combination comprising advancing means for advancing a textile web in a path, including an endless printing blanket and upstream and downstream reversing rollers about which said printing blanket is trained; printing means between said reversing rollers for printing onto the advancing web; and suction means beyond said downstream reversing roller and comprising a hollow perforate drum rotatable about an axis tranverse to said path and positioned to be partially surrounded by the textile web after the same moves off said printing blanket in the region of said downstream reversing roller, and a suction outlet in said drum, said web travelling about said perforate drum in contact therewith and being deflected through substantially 90°, and said suction outlet having an aperture which applies suction to the region where said web is deflected.

4,089,194

PRESSURE SEAL APPARATUS FOR A HIGH PRESSURE STEAMER

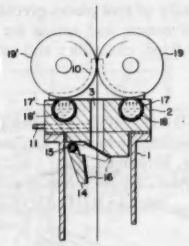
Yoshikazu Sando; Matsuo Minakata; Hiroshi Ishidoshiro; Masanobu Tomatsu, all of Wakayama, and Isao Kamei, Kainan, all of Japan, assignors to Sando Iron Works, Japan

Division of Ser. No. 584,262, Jun. 6, 1975, Pat. No. 4,020,657. This application Dec. 6, 1976, Ser. No. 747,927

Claims priority, application Japan, Jun. 10, 1974, 49-65816; Jun. 12, 1975, 50-66946; Jun. 12, 1975, 50-66947; Dec. 25, 1974, 50-4767

Int. Cl.² D06B *23/18*

U.S. Cl. 68—5 E **1 Claim**



1. A pressure seal apparatus for a high-pressure steamer, comprising a high-pressure vessel body having a feed-in opening and a take-out opening for passing a fiber product into and out of said vessel body, a seal block fixed to each of said feed-in opening and take-out opening and forming an upwardly extending passage therethrough, said seal block having an upwardly facing surface and an oppositely directed downwardly facing surface, said passage being rectangular in horizontal section with two long sides and two short sides, the upwardly facing surface of said seal block extending along the long sides of said passage having a recess formed therein spaced outwardly from said passage, a pair of rotatable seal rolls positioned above said seal block and disposed in contact with one another to form a nip aligned above the passage through said seal block, the axes of said seal rolls extending in generally parallel relation with the long sides of said passage, a first seal assembly located in each of the recesses extending along the long sides of said passage, each said first seal assembly disposed in sealing engagement with one of said seal rolls, and a second seal assembly located along each short side of said passage and disposed in pressure contact with each of the opposite transverse ends of said rolls, each said recess in the upwardly facing surface of said seal block comprises a concave groove along each of the long sides of the passage with said grooves being arranged symmetrically of the upwardly extending passage, said first seal assembly comprising a water permeable hose located in each of said convave grooves, each said water permeable hose disposed opposite to a different one of said seal rolls for placing each of said seal rolls positioned above said seal block in pressure contact with the oppositely disposed one of said water permeable hoses when water is supplied into said hoses so that said seal rolls rotate in frictional engagement with said hoses and the water permeating through said hoses provides a lubricating effect, and a shielding mechanism pivotally mounted at the downwardly facing surface of said seal block adjacent to the opposite end of the passage therethrough from said first seal assembly, said shielding mechanism being displaceable between a non-active position spaced from the passage opening in the downwardly facing surface during normal operation of the pressure seal apparatus and an active position blocking the passage opening in the downwardly facing surface when abnormal operation of the pressure seal apparatus occurs.

4,089,195

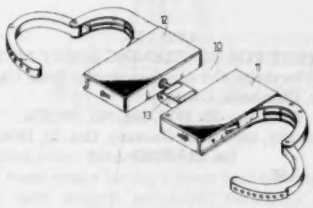
MANACLES

I-Chen Lai, 3rd Fl., 5 Lane 6, Chao-Yang Street, West District, Taichung City, China /Taiwan

Filed Jun. 24, 1977, Ser. No. 809,679

Int. Cl.² E05B *75/00*

U.S. Cl. 70—16 **5 Claims**



1. An improved manacle comprising two wristlet casings connected by a hinge, a receiver secured in one of said casings to receive the control signal from a transmitter, and an electric discharger controled by said control signal to produce an electric shock voltage applied to an electrode in a hooked portion of said casing whereby the electric shock is applied to the prisoner through said electrode if he is locked with the manacle.

4,089,196

METHOD OF CONTROLLING INTER-STAND TENSION IN ROLLING MILLS

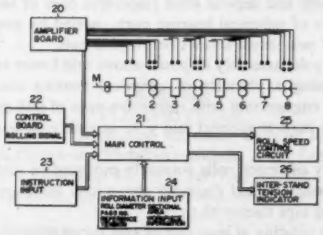
Katsuya Kondo, and Tomio Yamakawa, both of Amagasaki, Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Mar. 25, 1977, Ser. No. 781,327

Claims priority, application Japan, Mar. 26, 1976, 51-33212; Mar. 12, 1977, 52-27477

Int. Cl.² B21B *37/06*

U.S. Cl. 72—12 **17 Claims**



1. A method of controlling inter-stand tension in a multi-stand rolling mill which is provided with a means for measuring tension acting on a workpiece portion between a given (i)th stand and the next succeeding ($i+1$)th stand, said tension

means comprising at least one pair of load sensing devices provided at the entry and delivery sides of said (*i*)th stand to sense a force acting on a roll chock, comprising the steps of:

storing an output value from the tension measuring means in the condition where the workpiece is captured by the (*i*)th stand and has not yet been captured by the next succeeding ($i+1$)th stand and when the tension of the workpiece upstream of said (*i*)th stand has substantially reached a reference or desired value;

multiplying, after the workpiece has been captured by said succeeding ($i+1$)th stand, a difference value between the output value from the tension measuring means and said stored value by a predetermined correction coefficient K to obtain the value of actual tension acting on the workpiece between said (*i*)th stand and ($i+1$)th stands; and

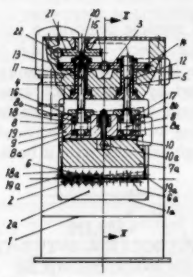
performing control of the rolling speed on the basis of an error or deviation between said tension value and a desired (*i*)th − ($i+1$)th inter-stand tension value.

4,089,197

MACHINE FOR FLATTENING SHEET METAL

Josef Ihle, Pforzheim, Germany, assignor to Irma Ungerer nee Dollinger, Pforzheim, Germany

Filed May 20, 1977, Ser. No. 799,074
Claims priority, application Germany, Oct. 20, 1976, 2647381
Int. Cl.[2] B21D *1/02*
U.S. Cl. 72—165 **9 Claims**



1. A machine for flattening sheet metal, comprising

a machine frame including a crosshead,

a plurality of lower rolls rotatably mounted in said machine frame below said crosshead,

a plurality of nuts carried by said crosshead and mounted for rotation on spaced apart vertical axes,

a plurality of thrust screws, which are in threaded engagement with and depend from respective ones of said nuts,

a plurality of spherical bearing parts carried by respective ones of said thrust screws below said nuts,

an upper yoke assembly disposed above said lower rolls and comprising a plurality of spherical bearing sockets in mating engagement with respective ones of said spherical bearing parts to support said yoke assembly on said thrust screws,

a plurality of upper rolls rotatably mounted in said upper yoke assembly and disposed above said lower rolls and defining nips therewith,

means for rotating at least one of said thrust screws relative to the nut associated therewith independently of another of said thrust screws, and

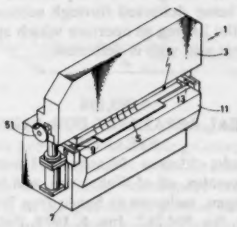
means for rotating at least one of said thrust screws relative to the nut associated therewith in unison with another of said thrust screws.

4,089,198

EXTENABLE TOOL AND MACHINE HAVING THE SAME

Tadashi Amano, Machida; Susumu Kawano, Atsugi, and Kenji Mano, Isehara, all of Japan, assignors to Amada Company, Ltd., Isehari, Japan

Filed Jun. 24, 1976, Ser. No. 699,306
Claims priority, application Japan, Jun. 24, 1975, 50-76545
Int. Cl.[2] B21D *37/12*
U.S. Cl. 72—320 **7 Claims**



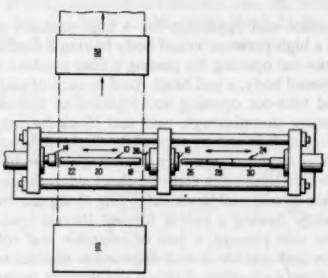
1. A metal processing apparatus comprising a fixed tool means, a retractable chain-like tool means pivotally connected with said fixed tool means; a movable tool means mounted in connection with said retractable chain-like tool means, said fixed, chain-like, and movable tool means being aligned to form a straight row and said retractable chain-like tool means comprising a plurality of tool pieces pivotally connected with each other by link means; and means for folding said metal about said aligned fixed, chain-like, and movable tool means.

4,089,199

BALL BAT AND METHOD OF MAKING THE SAME

Frederik A. Siemonsen, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.

Filed Mar. 14, 1977, Ser. No. 777,432
Int. Cl.[2] B21D *51/16*
U.S. Cl. 72—370 **7 Claims**



1. In the method of making a hollow metal ball bat having a substantially uniform wall thickness along the length thereof from a hollow metal tube having a substantially uniform inside and outside diameter the metal bat comprising an elongated hollow body having a cylindrical barrel portion of one outer diameter, a cylindrical handle portion of a reduced outer diameter and an intermediate portion of a tapering outer diameter between said barrel and handle portions, the method of making a ball bat blank including expanding the tube along part of its length over a mandrel having a tapered segment and a cylindrical segment having an outside diameter larger than the inside diameter of the tube, the steps of:

(a) expanding the handle portion of the tube over the tapered segment of the mandrel,

(b) subsequently expanding the handle portion of the tube

over the cylindrical segment of the mandrel while simultaneously expanding the intermediate portion of the tube over the tapered segment of the mandrel, and

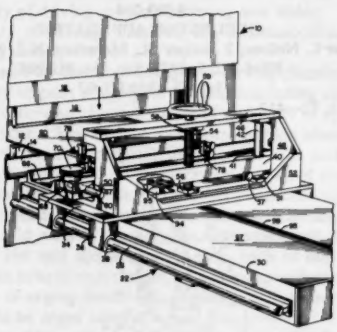
(c) ironing the outside of the said tube where it has been expanded in steps (a) and (b) to substantially the original outside diameter of the tube to form a metal blank having the outside thereof substantially uniform in diameter and the inside diameter of the barrel portion and the inside diameter of the handle portion being substantially uniform in diameter and said barrel and said handle portions being connected by an intermediate portion and said handle portion having a larger inside diameter than said barrel portion inside diameter.

4,089,200

GAGING SYSTEM

Sidney A. Wingate, Concord, and Elmo J. Pacini, Sudbury, both of Mass., assignors to Dynamics Research Corporation, Wilmington, Mass.

Filed Aug. 18, 1976, Ser. No. 715,539
Int. Cl.² B21D *11/22*
U.S. Cl. 72—389 **20 Claims**



1. A gaging system for use with a sheet forming machine and comprising:

a base having guides extending along a travel path;

a table slidably supported on said guides and operative to be moved therealong;

drive means directly coupled to said table for transport thereof along the travel path;

a support slidably mounted on the table and operative to be moved along an axis transverse to the axis of the travel path;

means for manual adjustment of the support along the transverse axis to predetermined positions along the transverse axis;

a linear encoder disposed along the entire length of travel path and directly coupled to the table for providing direct indication of table position along the travel path;

an elongated gage bar fixedly attached to the support;

manual adjusting means on the support for coarse adjustment of the bar along the axis of the travel path;

one or more gage stop assemblies mounted on the bar and providing a gaging surface against which a sheet can be positioned;

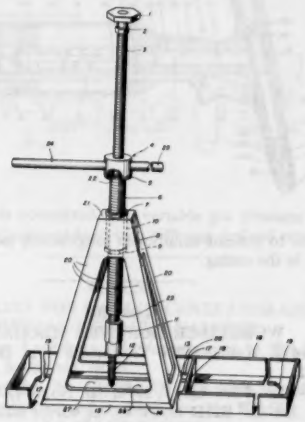
manual adjusting means on said one or more gage stop assemblies for fine adjustment of the gaging surface along the axis of the travel path.

4,089,201

SILENT DENT PULLER

Constantine Raptis, Box 14, Middlesex Rd., Tyngsboro, Mass. 01879

Filed May 27, 1976, Ser. No. 690,711
Int. Cl.² B21D *1/12*
U.S. Cl. 72—390 **8 Claims**



1. In a dent puller the combination of:

bracing frame means having a lower base defining a hollow figure with integral peripheral, outwardly projecting flanges and an upper interiorly threaded collar;

an exteriorly threaded guide shaft adjustable in said collar and having an annular, lower rim;

elongated base extension means having ribs and channels for slidably receiving said flanges, said means defining a hollow figure registering with the hollow figure of said frame means;

pull rod means rotatable and freely slidable in said guide shaft, said pull rod means including a threaded pull rod and a pull rod chuck having a pull tip therewithin; and

winged nut means threaded on said pull rod, outside said guide shaft for retracting said pull rod chuck and pull tip

the lower rim of said guide shaft serving as a stop for said chuck in the pulling of small area dents and said base extension means serving as a bridge over large area dents.

4,089,202

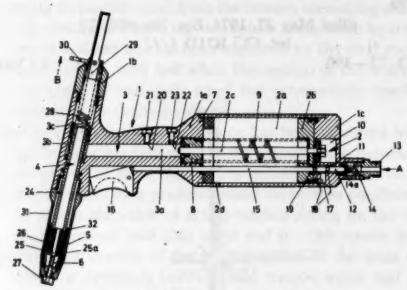
BLIND RIVETER

Manfred Schwab, Wiesbaden, Germany, assignor to Fa Alfred Hansel, Nieten-und Metallwarenfabrik, Ruhr, Germany

Filed Aug. 25, 1976, Ser. No. 717,490
Claims priority, application Germany, Aug. 25, 1975, 2537793
Int. Cl.² B21J *15/34*
U.S. Cl. 72—391 **18 Claims**

1. In a blind riveter comprising a casing, a tension chuck in the casing, means for moving the tension chuck longitudinally in the casing, and a closed hydraulic system for sliding the chuck moving means longitudinally in the casing, the improvement comprising a visible marking on the chuck moving means

and a viewing window in the casing for viewing the marking, said marking being arranged when visible through the viewing window to indicate insufficient longitudinal movement of the chuck in the casing.

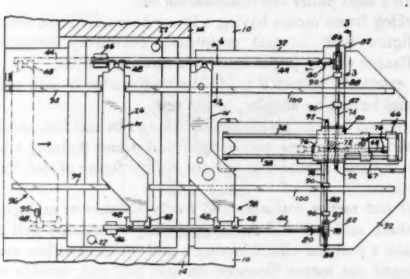


4,089,203

WORKPIECE TRANSFER MECHANISM

Bernard J. Wallis, 25200 Trowbridge Ave., Dearborn, Mich. 48124

Filed Apr. 7, 1976, Ser. No. 674,407
Int. Cl.[2] B21D *43/04, 43/05, 43/10;* B21J *13/08*
U.S. Cl. 72—405 **15 Claims**



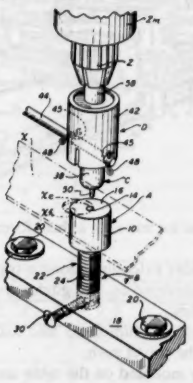
1. In combination with a metal stamping press, a transfer mechanism for moving workpieces between an idle station spaced from the die in the press and a working station at the die, said transfer mechanism comprising a base extending from and adapted to be fixedly connected to the press, a carriage guided for reciprocation on said base in a horizontal rectilinear path toward and away from the die, said carriage comprising a horizontally disposed rigid cross arm extending transversely of the path of travel of the carriage, means for reciprocating the carriage on said base through a predetermined stroke along said path of travel between advanced and retracted positions, said cross arm having means thereon defining a pair of support surfaces, a pair of support means mounted on said support surfaces in fixed spaced relation, said support means being adjustable lengthwise on said cross arm support surfaces to vary the spacing therebetween to a predetermined desired distance, a pair of horizontally disposed finger bars extending in parallel spaced relation lengthwise of the path of travel of the carriage, each finger bar being connected at one end to one of said support means in an axially and transversely fixed position so that the finger bars are spaced apart to correspond with the adjusted spacing between the support means and are reciprocated lengthwise in parallel fixed relation in response to reciprocation of the carriage, said finger bars extending from said cross arm into the die area of the press, guide means fixedly mounted relative to the press in spaced, transversely adjustable relation to correspond with the adjusted spacing between said support means, said guide means slideably supporting the other ends of said finger bars for lengthwise reciprocation in parallel relation, said finger bars having work-engaging fingers thereon, means mounted on and movable with said support means for moving said fingers in one direction to engage a workpiece extending transversely between the two finger bars and thereby advance the workpiece horizontally when the carriage is thereafter reciprocated in one direction, said fingers being movable in the opposite direction to release the workpiece and bypass the same when the carriage is thereafter reciprocated in the opposite direction, a drive mechanism mounted on said carriage between said support means, means mounted on and movable with said cross arm for actuating said finger moving means in timed relation with the reciprocation of said carriage, said actuating means extending between said drive mechanism and said finger moving means for establishing a driving connection therebetween, the spacing between said finger bars being variable by means of the transverse adjustability of said support means and said guide means to accommodate workpieces of different sizes and said actuating means being variable in length for establishing a driving connection between said drive mechanism and said finger moving means in accordance with the adjusted spacing between said support means.

4,089,204

DEBURRING APPARATUS

Hildaur L. Neilsen, 2 Juniper St., Metuchen, N.J. 08840

Filed Jul. 5, 1977, Ser. No. 812,988
Int. Cl.[2] B21J *7/02*
U.S. Cl. 72—412 **5 Claims**



1. Deburring apparatus comprising a generally cylindrical peening tool formed with a cylindrical body portion and an adjoining, coaxial, rigidly-integral, cylindrical, pilot of reduced diameter extending downwardly from said body portion, the juncture of said body portion and pilot being formed to provide an annular outwardly-concave juncture surface; a hammering assembly coacting with said tool to impose intermittent, downwardly directed, hammering force upon said tool; separate anvil means disposed below said tool and formed with an upwardly opening bore therein of such diameter as to admit said pilot thereinto with an accurate sliding fit; and said assembly and tool on the one hand and said anvil means on the other hand being movable approximately vertically relatively to each other to bring said juncture surface into peening engagement with an adjacent edge of a related workpiece and to project a lower portion of said pilot into said bore.

4,089,205

TRANSFER PRESS

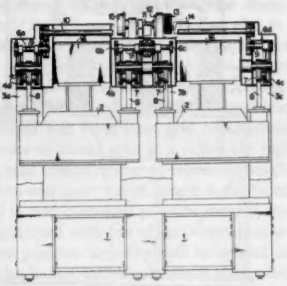
Masakatsu Mizumoto, Kanazawa, and Hisateru Yamashita, Komatsu, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 22, 1976, Ser. No. 753,229

Claims priority, application Japan, Dec. 26, 1975, 50-175448[U]

Int. Cl.[2] B21J 9/18

U.S. Cl. 72—450 **3 Claims**



1. A transfer press comprising:
a bed;
at least two slides arranged in series above said bed;
a plurality of driving means for driving said slides;
a plurality of driving chambers for accommodating said driving means;
frame means for interconnecting said driving chambers;
a plurality of pairs of uprights for interconnecting said bed and said driving chambers, each of said pairs of uprights comprising a forward and a rearward upright element;
a connecting rod means being provided for each said slide, each connecting rod means comprising a pair of connecting rods, said connecting rods being connected adjacent opposite ends of each said slide and being arranged between said pairs of uprights for connecting said driving means and said slides, so as to urge each of said slides adjacent to both ends thereof for achieving uniform distribution of urging forces and avoiding inclination of said slides to be urged relative to said bed;
a plurality of tie rods inserted within said uprights for connecting said chambers with said bed; and
a single motor means for driving all of said driving means simultaneously.

4,089,206

METHOD AND APPARATUS FOR MEASURING THE PROPORTION OF UNDISSOLVED GAS IN A LIQUID COMPONENT FOR THE PRODUCTION OF FOAM MATERIALS

Reiner Raffel, Siegburg; Ferdinand Althausen, Neunkirchen; Ulrich Knipp, Schildgen-Nittum; Kurt Krippl, Monheim; Wolfgang Fohr, Neunkirchen-Salchendorf, and Helmut Schwesig, Aachen, all of Germany, assignors to Maschinenfabrik Hennecke GmbH and Bayer Aktiengesellschaft, both of Leverkusen, Germany

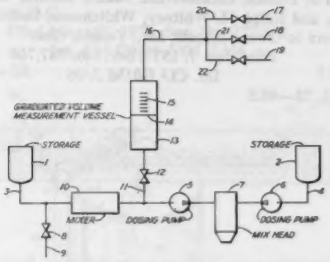
Filed Sep. 17, 1976, Ser. No. 724,132

Claims priority, application Germany, Sep. 27, 1975, 2543301

Int. Cl.[2] G01N 7/00

U.S. Cl. 73—19 **2 Claims**

1. An apparatus for measuring the proportion of undissolved gas in a liquid component for foam materials comprising (1) a storage container for said liquid component, from which an input conduit leads via a dosing pump to a mixing head, (2) a gas inlet conduit connected to said input conduit, and (3) a closeable branch conduit connected at one end to the input conduit between the gas inlet conduit and the mixing head and at the other end to an inlet for a closed graduated measurement



vessel, which is connected to a variable gas pressure means capable of producing at least two different defined pressures.

4,089,207

ACCESSORY FOR GAS CONCENTRATOR-GAS CHROMATOGRAPH ANALYZER

Jesse C. Patton, Lewisburg, W. Va., assignor to The Bendix Corporation, Southfield, Mich.

Continuation of Ser. No. 534,593, Dec. 20, 1975, abandoned.

This application Jul. 6, 1976, Ser. No. 702,635

Int. Cl.[2] G01N 31/08

U.S. Cl. 73—23.1 **3 Claims**

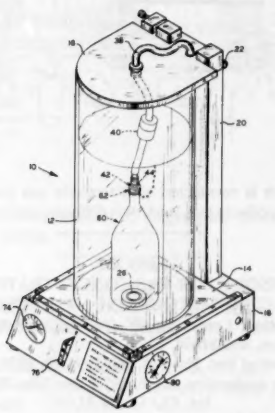
1. A flasher assembly for use in a gas concentrator-gas chromatograph analytical system wherein the concentrator includes a column packed with adsorbent material, comprising
a housing having a hinged door therein;
a thermally conductive heater block having a substantial heat capacity mounted within said housing and accessible upon opening said door, said block having a channel therein to receive the concentrator column in thermally conductive contact and being divided into two hinged together relatively movable to expose said block channel;
means linking said housing door to one of said block parts so that opening said door moves said one block part into a position exposing said block channel;
an inlet gas conduit for supplying carrier gas to said concentrator column and an outlet gas conduit for conveying gas and vapors from said concentrator column to the inlet of the gas chromatograph;
a socket-like connector for each of said inlet and outlet conduit, said connectors being positioned at opposite ends of said block channel and in alignment therewith, and being adapted to slidingly receive the ends of said concentrator column and provide a gas tight connection thereto, one of said connectors being fixedly mounted with respect to said block, the other of said connectors being movably mounted with respect to said block to provide clearance permitting the sliding engagement of disengagement of said concentrator column with said connectors.

4,089,208

PRESSURE TEST FIXTURE FOR PRESSURIZED CONTAINERS

Nelson J. Franks, Lambertville, Mich.; Thomas W. Gray, Toledo, and Ralph H. Whitney, Whitehouse, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Jan. 7, 1977, Ser. No. 757,766
Int. Cl.² G01M *3/06*
U.S. Cl. 73—45.5 **8 Claims**



1. Apparatus for pressure testing containers subsequent to the containers being filled and sealed comprising:

a tank for receiving the container to be tested, said tank including a side wall, bottom wall, and a top wall, the top wall being selectively openable to provide access to the interior of said tank;

a pressurizing fixture for piercing the container being tested, and thereby providing communication with the interior of the container, said fixture including a piercing nose portion and a threaded shank portion associated therewith for forming a threaded engagement with the pierced container; and

means providing communication between a source of pressure fluid and said pressurizing fixture.

4,089,209

REMOTE WATER MONITORING SYSTEM

David C. Grana, and David P. Haynes, both of Newport News, Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Aug. 4, 1977, Ser. No. 821,681
Int. Cl.² G01N *1/10*
U.S. Cl. 73—61 R **7 Claims**

1. A remotely operated water monitoring system for obtaining a series of representative water samples taken at desired time intervals in a body of water comprising, in combination:

a remote sending and receiving station for sending and receiving signals above the surface of the water body;

means for transmitting signals from said station into the water body;

a sterile watertight sample unit adaptable for lowering into the water body;

a plurality of chambers within said sample unit for the receipt and storage of water samples in a controlled environment;

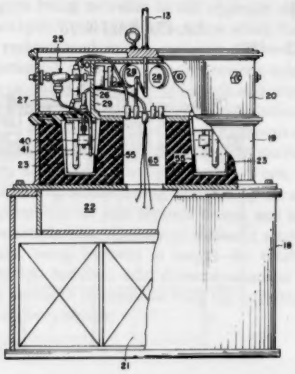
delivery means for admitting representative water samples to each said chamber;

means for activating said delivery means;

means for controlling the volume of each sample taken;

means for analyzing each sample taken for a specific property and producing data thereon; and

control means for receiving and transmitting signals and differentiating between at least two types of signals so received, receipt of the first type of said signals each time triggering said means for activating said delivery means



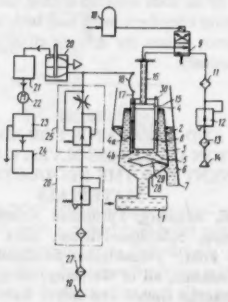
for only one said sample chamber, the triggering being in a sequential pattern until each of said plurality of receptacles contains a water sample; while the receipt of the second type of said signals each time causes said control means to receive said data from said analysis means and transmit information thereon to said remote sending and receiving station.

4,089,210

DEVICE FOR MEASURING FILTERING PROPERTIES OF PAPER PULP

Alexandr Fedorovich Tischenko, bulvar Shevchenko, 9/28, kv. 27; Nisson Meerovich Yanishevsky, ulitsa Iskrovskaya, 3, kv. 46, and Mikhail Alexandrovich Ivanov, ulitsa Scherbakova, 90, kv. 24, all of Kiev, U.S.S.R.

Filed Dec. 21, 1976, Ser. No. 753,001
Claims priority, application U.S.S.R., Jan. 15, 1976, 2312302
Int. Cl.² G01N *15/00*
U.S. Cl. 73—63 **5 Claims**



1. For use in the measurement of filtering properties of paper pulp, outer vessel means forming a fixed-level pulp reservoir and including a means for placing the interior of said outer vessel means in communication with a pulp duct so that pulp will flow from the pulp duct into the interior of said outer vessel means to form said fixed-level pulp reservoir, inner vessel means for receiving pulp from said outer vessel means and for discharging received pulp back to said outer vessel means, said inner vessel means having an immersed position

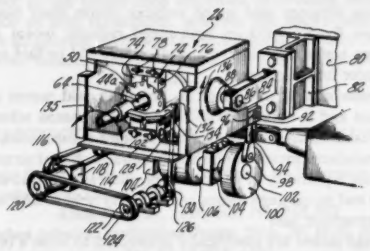
situated at least partly within said outer vessel means and a non-immersed position situated above the level of the pulp in said outer vessel means, and said inner vessel means having an imperforate side wall and a filter bottom so that when said inner vessel means is displaced from said non-immersed to said immersed position thereof pulp in said outer vessel means will flow through said filter bottom of said inner vessel means into the interior thereof, said inner vessel means having in its interior a compartment of relatively large cross-sectional area situated directly above said filter bottom for receiving filtrate passing through said filter bottom directly from said filter bottom, and said inner vessel means having also in its interior a compartment of relatively small cross-sectional area communicating at a lower end directly with said compartment of relatively large cross-sectional area and extending upwardly from said compartment of relatively large cross-sectional area so that the filtrate will flow from said compartment of relatively large cross-sectional area at a relatively rapid rate upwardly along said compartment of relatively small cross-sectional area when said inner vessel means is displaced from said non-immersed to said immersed position thereof, power means operatively connected with one of said vessel means for changing the relative position between said inner and outer vessel means while displacing said inner vessel means between said positions thereof, measuring means situated in said compartment of relatively small cross-sectional area for measuring the filtrate level in said inner vessel means, and a follow-up system operatively connected with said measuring means for recording the results of a measurement made thereby.

4,089,211

ELASTOMERIC BEARING TEST MACHINE

Robert Joseph Vercellone, North Haven, and Samuel Philip Baron, Fairfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 1, 1976, Ser. No. 737,373
Int. Cl.² G01M *13/04*
U.S. Cl. 73—93 **17 Claims**



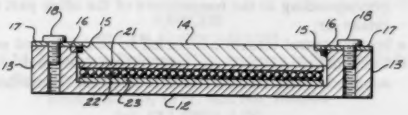
1. A machine for testing elastomeric bearings for helicopter rotors comprising an elongated test bed, a simulated rotor head at one end of said bed in which a bearing is mounted, a simulated blade supported on said bed including a shaft at one end attached to said bearing, said blade having its other end attached to a member movable axially of said bed, means for moving said member to apply a compressive force to said bearing which simulates the centrifugal forces encountered by a bearing due to blade rotation in normal flight, means for supporting said rotor head for oscillations about the flapping axis of said bearing to simulate forces normally encountered by said bearing due to flapping and lead-lag movements of a blade in flight, means for oscillating said rotor head, and means for oscillating said shaft about its longitudinal axis to apply torsional forces to said bearing simulating aerodynamic forces encountered by a bearing in normal flight due to changes in blade pitch.

4,089,212

BRINELL SANDWICH TRANSDUCER

Andres Peekna, Vicksburg, Miss., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 14, 1977, Ser. No. 777,383
Int. Cl.² G01N *3/08, 3/48*
U.S. Cl. 73—94 **7 Claims**



1. In a Brinell sandwich stress gauge having relatively flexible gauge body faces,
a disc-shaped bottom means,
a tubular side means comparatively thicker than and integral with said bottom means to define therewith an open circular chamber,
a first disc of relatively low strain rate sensitive material dimensioned to fit snugly in the bottom of said circular chamber,
a plurality of hardened steel balls formed in a layer atop said first disc means,
a second disc of relatively low strain rate sensitive material dimensioned to fit snugly on top of said layer of balls,
a cover means of thickness comparable to said bottom means having sealing accommodating means therein,
sealing means therefor, and
a retaining ring to complete the encasement means.

4,089,213

NONSURFACTANT REMOVER COMPOSITION FOR INSPECTION PENETRANTS

James R. Alburger, 5007 Hillard Ave., La Canada, Calif. 91011

Filed Jul. 7, 1977, Ser. No. 813,618
Int. Cl.² G01N *21/16*; C09K *11/06, 3/00*
U.S. Cl. 73—104 **5 Claims**

1. In an inspection penetrant process employing a dyed liquid nonsurfactant-type penetrant, a remover, and an optional finish water-rinse, wherein parts to be tested for the presence of surface flaws are first treated with said penetrant, excess surface penetrant is removed in a surface-conditioning step, background porosity entrapments are removed by washing said test parts in said remover, and said test parts are dried, developed, and inspected for the presence of flaw indications, the improvement in which said remover consists of a water solution of a solvency accelerator, said solvency accelerator being at least one member selected from the group consisting of
Hydroquinone,
Pyrocatechol,
Resorcinol,
Sodium benzoate, and
Carbamide (urea).

4,089,214

INTAKE AIR AMOUNT DETECTING SYSTEM

Tsuneyuki Egami, Okazaki; Hisasi Kawai, Toyohashi; Tokio Kohama, Nishio, and Hideki Obayashi, Aichi, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Jun. 22, 1977, Ser. No. 809,041
Claims priority, application Japan, Jul. 5, 1976, 51-79675
Int. Cl.² G01M *15/00*; G01F *1/68*
U.S. Cl. 73—116 **10 Claims**

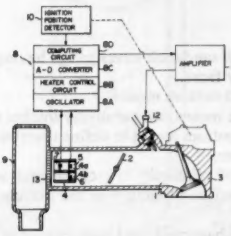
1. An intake air amount detecting system for internal combustion engine comprising:
an electric heater, positioned in the intake passage of an engine, for heating a part of the intake air flowing through

said intake passage in accordance with a first voltage supplied thereto;

a first temperature sensor, positioned in said intake passage of said engine, for generating a first output signal corresponding to the temperature of said a part of the intake air heated by said electric heater;

a second temperature sensor, positioned in said intake passage of said engine, for generating a second output signal corresponding to the temperature of the other part of the intake air;

a heater control circuit, connected to said first and second temperature sensors, for controlling said first voltage supplied to said electric heater in response to said first and



second output signals so that the temperature difference between said part and the other part of the intake air is kept constant, said voltage increasing as the amount of the intake air increases;

a time constant circuit including a capacitor adapted to be charged at a varying charging ratio to generate a second voltage which increases as the charging time increases; and

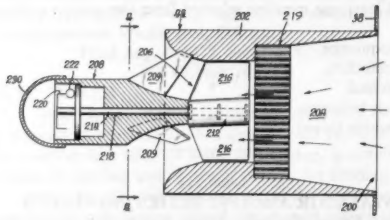
a comparison circuit, connected to receive said first and second voltages, for comparing the former with the latter to generate a pulse signal having a time width which increases as said first voltage increases, whereby said time width is in a proportional relationship with the amount of the intake air.

4,089,215

AIR FLOW TRANSDUCER

Leonard Lee Chapin, El Paso, Tex., assignor to Autotronic Controls, Corp., El Paso, Tex.

Filed Apr. 1, 1977, Ser. No. 783,612
Int. Cl.[2] F02B *2/00*
U.S. Cl. 73—116 **7 Claims**



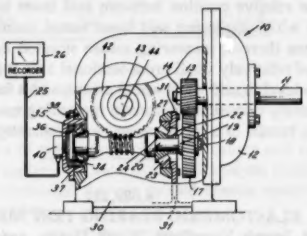
1. An air flow transducer for measuring the rate of air flow into the intake manifold of an internal combustion engine having a propensity to backfire on occasion, said transducer comprising a flow tube forming a passageway, means for mounting said flow tube to pass the air flowing to said intake manifold through said passageway, a rotor having a shaft with a hub mounted thereon for rotation therewith and a plurality of vanes extending outwardly from said hub, means for mounting said shaft for rotation of said rotor within said passageway, and signal means for providing an electrical signal systematically related to the rate of rotation of said rotor, said vanes being equally spaced around the periphery of said hub and shaped to intercept air flowing through said passageway for movement by said air, said vanes being formed of low density plastic, each of said vanes having a thickened root at which it joins said hub, and each of said vanes having a trailing edge that slopes from said hub in the upstream direction at a substantial angle to the plane normal to said shaft to provide a reaction surface to any backfire pressure wave that forces said trailing edge in the direction of said hub in counteraction to forces created by said backfire pressure wave directed to tearing said vane from said hub.

4,089,216

LOAD MEASUREMENT DEVICE

Charles R. Elias, Livonia, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.

Filed Jun. 14, 1976, Ser. No. 695,894
Int. Cl.[2] G01L *3/14, 5/12*
U.S. Cl. 73—136 R **24 Claims**



1. An apparatus for detecting and measuring the torque characteristic of a worm and gear speed reducer means comprising a housing means, a worm shaft means, and a worm shaft bearing means wherein the improvement comprises

a transducer means located inside said speed reducer housing means between said speed reducer worm shaft bearing means fixedly held on said speed reducer worm shaft means and a retaining means affixedly held to said speed reducer housing means,

said transducer is positioned in line with said worm shaft means and is connected to an indicating means whereby the axial thrust load of said worm shaft is measured,

said transducer means comprises an annular shaped structure having a plurality of pad means on each side of said structure and strain gage means are affixedly held to said annular structure, and

said gage means are electrically connected to form a bridge network wherein said network is connected to an electrical voltage source means and signals from said bridge network are connected to said indicating means.

4,089,217

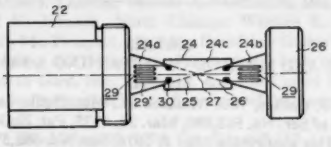
GUIDED-BEAM TRANSDUCERS

Amir Rahav, and Mathy Raz, both of Ramat Hasharon, Israel, assignors to Tedea Technological Development and Automation Ltd., Tel Aviv, Israel

Filed Sep. 16, 1976, Ser. No. 724,009
Int. Cl.[2] G01L *1/22*
U.S. Cl. 73—141 A **10 Claims**

1. A guided-beam transducer, comprising: a transducer body; a beam having one end section fixed to said body, an opposite end section adapted to receive a load normal to the beam acting to deflect same, and an intermediate section joining together said two end sections; each of said two end sections being formed with opposed edges that converge towards

each other along straight lines crossing at the centre of the beam; means for guiding the deflection of said beam; and a



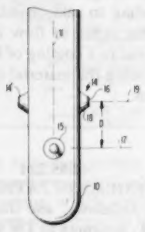
strain gage bonded to each of said two end sections within the opposed converging edges thereof.

4,089,218

ELECTROMAGNETIC WATER CURRENT METER WITH STAGGERED STICK OUT ELECTRODES

Vincent J. Cushing, 410 Standish Dr., Deerfield, Ill. 60015

Filed Dec. 29, 1976, Ser. No. 755,293
Int. Cl.² G01F *1/58*
U.S. Cl. 73—189 **5 Claims**



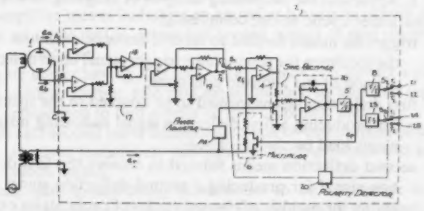
1. An electromagnetic flow transducer including a generally cylindrical body of circular cross-section and having two pairs of electrodes, each pair of electrodes lying on different diameters of said cylinder, each of said diameters rotated 90° with respect to the other, each electrode protruding beyond the surface of said transducer, wherein the improvement comprises staggering each pair of electrodes from another pair by an offset distance along a longitudinal axis of said cylinder.

4,089,219

BI-DIRECTIONAL OUTPUT ELECTROMAGNETIC FLOWMETER

Kazuie Suzuki, Tokyo, Japan, assignor to Hokushin Electric Works, Ltd., Tokyo, Japan

Filed Nov. 29, 1976, Ser. No. 745,862
Claims priority, application Japan, Nov. 29, 1975, 50-143222
Int. Cl.² G01F *1/60*
U.S. Cl. 73—194 EM **3 Claims**



1. A converter circuit for an electromagnetic flowmeter in which a fluid is flowable in a normal direction or in the reverse direction and having a bi-directional output, said flowmeter having a pair of electrodes yielding an input signal that depends on flow rate, said circuit comprising:

(A) a polarity-detecting means responsive to the direction of flow to detect the polarity of said input signal;

(B) inverting means to invert the polarity of said input signal; and

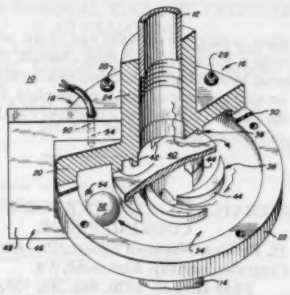
(C) switching means to select the inverted or non-inverted input signal in accordance with the output from said polarity-detecting means.

4,089,220

FLUID FLOW METER

Donald M. Houlberg, Delavan, Wis., assignor to Sta-Rite Industries, Inc., Racine, Wis.

Filed Mar. 23, 1977, Ser. No. 780,330
Int. Cl.² G01F *1/00*
U.S. Cl. 73—194 C **12 Claims**



1. A meter for measuring the flow rate of fluid in a fluid line comprising:

a casing having a fluid inlet and a fluid outlet;

a chamber defined within said casing, said chamber being in fluid communication with said inlet and said outlet;

a first vane assembly mounted in said chamber and adjacent said inlet;

a second vane assembly mounted in said chamber and adjacent said outlet;

means for partitioning said chamber and separating said first and second vane assemblies;

a fluid flow responsive member positioned in said chamber radially outward of said first and second vane assemblies and being adapted to rotate in said chamber upon introduction of fluid flow therein; and

an annular track defined between the outer peripheries of said first and second vane assemblies and the inner periphery of said casing.

4,089,221

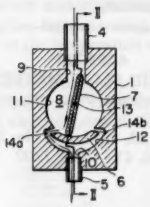
WOBBLE PLATE FLOW-RATE MEASURING DEVICE

Akinori Yokota, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jul. 7, 1976, Ser. No. 703,292
Claims priority, application Japan, Jul. 8, 1975, 50/83883
Int. Cl.² G01F *3/14*
U.S. Cl. 73—252 **6 Claims**

1. A flow rate measuring device comprising a casing provided with a chamber, an inlet channel and an outlet channel, a baffle plate having a part-circular surface for dividing the chamber into a forward chamber portion connected to the inlet channel and a rearward chamber portion connected to the outlet channel, said forward and rearward chamber portions being connected by first and second connecting open channels formed at opposite ends of said baffle plate, and a wobble plate pivotally mounted on a transverse shaft in said forward chamber portion and rotatable about said transverse shaft between two extreme positions between said open channels, said transverse shaft being located in a position which substantially divides the wobble plate into equal working sections, the cen-

ter of curvature of said baffle plate being located at the position of said transverse shaft so that the rearward end of the wobble plate closely follows the curvature of said baffle plate as the wobble plate rotates about said transverse shaft, flow of fluid into the inlet channel of said device and along one side of said



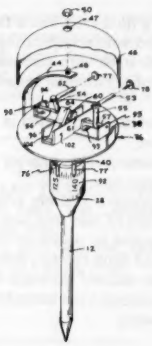
wobble plate urging the forward end of the wobble plate into contact with a surface of said inlet channel, the flow of fluid being altered by said baffle plate and passing through the outlet channel on said one side of said wobble plate, the fluid thereby causing the plate to oscillate at a frequency that is a function of the rate of flow of said fluid.

4,089,222

TEMPERATURE TELEMETRY FOR A SETTABLE COOKING PROBE

Charles H. Perkins, Newtown Square, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Dec. 30, 1976, Ser. No. 755,626
Int. Cl.² G01K *5/44*
U.S. Cl. 73—352 **11 Claims**



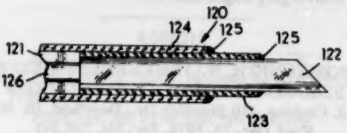
1. A thermally responsive signaling device comprising:
a probe having a pointed end adapted to be inserted into a mass to undergo a temperature change;
a cap carried on the opposite end of said probe;
a cavity in said probe in heat exchange relationship with said mass through a pointed end of a the wall of said probe;
a thermally expansive material within said cavity;
a displaceable means in pressure responsive relationship with said thermally expansive material and extending through an end wall of said probe;
sonic or ultrasonic signal generating means including coacting biased means to generate a signal on said cap in response to movement by said displaceable means;
latch means mounted on said cap to inhibit operation of said biased means of said signal generating means;
rod means slidably received within said probe and extending through said cap and mechanically linking said displaceable means to said latch means;
adjustment means mounted between said latch means and said displacement means for variable spacing of said latch means relative to said displacement means whereby the temperature responsive of said device is fixedly adjustable.

4,089,223

DEVICE AND METHOD OF OBTAINING A SAMPLE OF LIQUID

William J. Collins, 7005 Madison St., Merrillville, Ind. 46410

Division of Ser. No. 563,590, Mar. 31, 1975, Pat. No. 4,002,072.
This application May 3, 1976, Ser. No. 682,576
Int. Cl.² G01N *1/12*
U.S. Cl. 73—425.4 R **10 Claims**



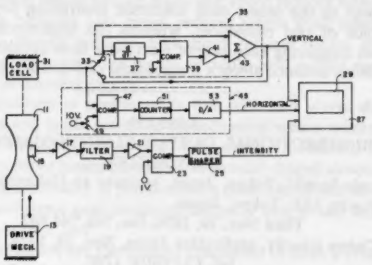
10. A method of obtaining a sample of molten material which comprises inserting a device having a chamber and a tubular passage leading to said chamber into a mass of such material to cause the latter to flow into said chamber, and subjecting the material to a coating of fusible means lining said passage for conditioning the material as it flows to said chamber for solidification.

4,089,224

ACOUSTIC EMISSION FATIGUE ANALYZER

William R. Scott, Andalusia, and John M. Carlyle, Willow Grove, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 25, 1977, Ser. No. 772,040
Int. Cl.² G01N *3/00*
U.S. Cl. 73—587 **18 Claims**



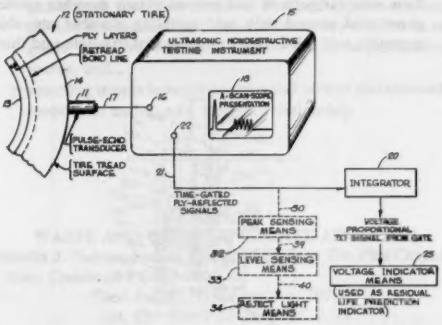
1. Apparatus for facilitating analysis of fatiguing of a specimen under cyclic stress, comprising:
triggering means formed to receive acoustic emissions from the specimen for producing a trigger signal upon detection of each of the acoustic emissions;
first deflection means formed to be coupled to the specimen for producing a first deflection signal indicating instantaneous load on the specimen;
second deflection means formed to receive the first deflection signal for producing a second deflection signal indicating the number of elapsed cycles of cyclic stress experienced by the specimen; and
recording means connected to receive the trigger, first deflection and second deflection signals for plotting on a plane, upon receiving the trigger signal, a point whose coordinates are determined by the first and second deflection signals.

4,089,225

SYSTEM FOR RESIDUAL TIRE LIFE PREDICTION BY ULTRASOUND

Irvin R. Kraska, Lansing; Thomas A. Mathieson, Des Plaines; Richard N. Johnson, North Chicago; Wieslaw L. Lichodziejewski, Mt. Prospect, all of Ill.; David Leo Gamache, Sterling Heights, and Leon Ash, Birmingham, both of Mich., assignors to Gard, Inc., Niles, Ill. and The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 16, 1976, Ser. No. 667,417
Int. Cl.[2] G01N *29/04*
U.S. Cl. 73—614 **14 Claims**



1. A pulse ultrasonic reflection system, useful for residual tire life prediction by monitoring cord/rubber condition of at least one ply of a tire carcass, which comprises:

a transmitter transducer that converts high-frequency electrical pulses provided to its input into pulses of ultrasonic vibrations for transmittal into an area of the multi-ply containing portion of the carcass of a tire to be tested;

clock means to provide voltage signals at its output;

means having an input and an output, said means being constructed to provide a pulse of high-frequency electrical energy at its output after it is triggered by each voltage signal that is received at its said input, said pulse-providing means having an input connected to said output of said clock means that by its periodic voltage signals initiates and controls the frequency at which the high-frequency electrical pulses are provided by said pulse-providing means to said transmitter transducer;

a receiver transducer, that in the system is either mounted relative to said transmitter transducer to provide a pitch-catch type or is constructed with said transmitter transducer to provide a pulse-echo type of pulse ultrasonic reflection system, to receive ultrasonic energy reflected by the tire after each ultrasonic pulse provided to the tire by said transmitter transducer, said receiver transducer having an output that provides voltage signals based on said received reflected ultrasonic energy;

amplifier means including an amplifier having an output and an input that is connected to said output of said receiver transducer;

gate means having first and second inputs and having a gate with an output, said gate means having: its said first input connected to said output of said amplifier; and

its said second input connected to one of said outputs of said receiver transducer, said pulse-providing means and said clock means,

said gate means being constructed to be responsive to a voltage signal at said second input of said gate means to open said gate of said gate means, after a predetermined delay, for a predetermined period of time to provide time-gated voltage signals at said output of said gate, after each pulse is provided by said pulse-providing means to said transducer, based on the reflected ultrasonic energy only from the interior portion of the tire, that includes at least one ply of the tire, to which the ultrasonic energy is applied by said transmitter transducer;

processing means having an output and an output that is connected to said output of said gate of said gate means, said processing means being constructed to convert the time-gated amplified signals from said output of said gate, after each electrical pulse provided to said transmitter transducer, to one voltage signal representing the cord-/rubber condition of plies of the carcass of the tire; and

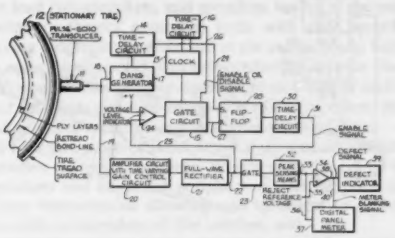
means having an input connected to said output of said processing means and constructed to provide a visual readout based on said voltage signal, provided at said output of said processing means, that indicates the condition of plies of the carcass of the tire.

4,089,226

SYSTEM FOR RESIDUAL TIRE LIFE PREDICTION BY ULTRASOUND

Irvin R. Kraska, Lansing; John Stark, Bartlett, and Wieslaw L. Lichodziejewski, Schaumburg, all of Ill., assignors to Gard, Inc., Niles, Ill.

Filed Mar. 10, 1977, Ser. No. 776,273
Int. Cl.[2] G01N *29/04*
U.S. Cl. 73—614 **19 Claims**



1. A system, useful to predict residual tire life of a steel belted tire, which comprises:

a band generator having an input and an output to provide pulses of high-frequency electrical energy at said output when triggered by a signal at said input;

a clock;

time-delay means that is connected to said clock and to said input of said band generator to provide a trigger signal, after a predetermined delay, to said bang generator for each clock signal;

a pulse-echo transducer connected to said output of said bang generator to convert received pulses of electrical energy to pulses of ultrasonic energy, to receive ultrasonic energy reflected from plies of a tire when used to examine such tire, and to convert the received reflected ultrasonic energy to signals of electrical energy;

an amplifier circuit with time varying gain control circuit, said amplifier circuit having an input connected to said bang generator and said transducer and having an output;

a full-wave rectifier having an output and an input that is connected to said output of said amplifier circuit;

a gate having an output and an input that is connected to said full-wave rectifier;

processing means having an output and an input that is connected to said gate, said processing means being constructed to convert the time-gated rectified amplified signals from said output of said gate, after each electrical pulse provided to said transducer, to one voltage signal representing the condition of plies of the casing of the tire;

means having an input connected to said output of said processing means and constructed to provide a visual readout based on said voltage signal, provided at said output of said processing means that indicates the condition of plies of the casing of the tire; and

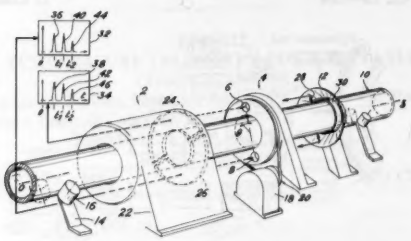
gate-enabling means connected to said gate, to said output of said full-wave rectifier and to said clock, said gate-enabling means being constructed to be responsive to each of said clock signals and after a predetermined delay, greater than said delay of said time-delay means, to process a signal from said rectifier, after said greater delay, that has an amplitude at least equal to that based on the reflected energy from the outer steel belt of the tire, to provide, after a further predetermined delay, an enabling of said gate for a predetermined period of time to pass signals from said rectifier to said processing means.

4,089,227

APPARATUS FOR MEASURING THE RADIAL DIMENSIONS OF A CYLINDRICAL TUBE BY ULTRASONICS

Jean Paul Falgari, Brignoud; Jean Perdijon, Saint Ismier, and Bernard Voiturier, Grenoble, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 28, 1977, Ser. No. 772,987
Claims priority, application France, Mar. 29, 1976, 76 09081
Int. Cl.[2] G01N *29/04*
U.S. Cl. 73—622 **10 Claims**



1. An apparatus for measuring the radial dimensions of a cylindrical tube by ultrasonics by means of which it is possible to measure the radial dimensions of said tube in directions perpendicular to the direction of the ultrasonic beam or beams emitted by one or more transducers, wherein it comprises a fixed ultrasonic transducer, whose emitting part is shaped like a cylindrical ring emitting ultrasonic pulses in accordance with a bundle of rays substantially parallel to the generating lines of the cylindrical tube and receiving echoes of said pulses, a truncated cone-shaped mirror whose apex angle is equal to 90° and whose axis is parallel to the radii of the bundle of ultrasonic rays emitted by the transducer or transducers, a rotary shield having at least one opening arranged between the transducer and the tube whose radial dimensions are to be measured and means connected to said transducer for measuring the time gaps separating the reception of the ultrasonic echoes returned by the tube.

4,089,228

MOTION GENERATING MECHANISM

Bart R. Obra, St. Clair Shores, Mich., assignor to Easom Engineering & Manufacturing Corporation, St. Clair Shores, Mich.

Filed Jun. 9, 1975, Ser. No. 584,761
Int. Cl.[2] F16H *37/12*
U.S. Cl. 74—52 **10 Claims**

1. A combined epicycloidal and harmonic motion generating mechanism comprising:

a support frame;

a first rotary member carried by said support frame for rotation about a fixed first axis;

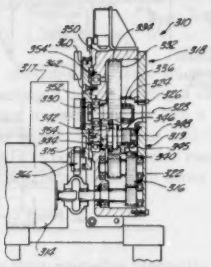
first driving means for driving said first rotary member at a constant velocity;

a second rotary member carried by said first rotary member and rotatable therewith about said first axis as said second rotating member rotates about a second movable axis that is parallel to said first axis;

rotation inducing means carried by said support frame and engaging said second rotary member for rotating said second rotary member about said second axis;

a third rotary member carried by said support frame for rotation about said first axis, said third rotary member being axially spaced from said first and second rotary members, said third rotary member having one side thereof adjacent said second rotary member, said one side having a radial slot;

a coupling member carried by said second rotary member and disposed along an axis which is spaced from said second axis, said coupling member moving along a uniform circular path as said second rotary member rotates about said second axis, said coupling member movably engaging said third rotary member slot to rotate said third



rotary member about said first axis as said second rotary member rotates, the engagement of said coupling member with said slot being such that there is a relative lost motion between said coupling member and said third rotating member during cyclical periods of movement of said coupling member whereby said third member accelerates from or near zero velocity and decelerates to or near zero velocity as said first rotary member rotates at a constant valocity;

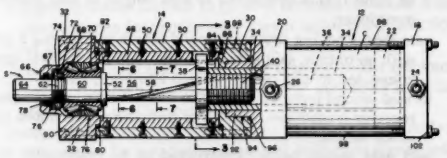
said rotation inducing means being a stationary gear carried by said support frame, said second rotary member having a gear formed thereon and engaging said stationary gear such that said second rotary member rotates about said second movable axis as said first rotary member moves said second rotary member relative to said stationary gear; and said coupling member being disposed along an axis which is spaced from said second axis.

4,089,229

ROTARY TORQUE ACTUATOR

James Leonard Geraci, 9759 Acton Ct., Cincinnati, Ohio 45241

Filed Aug. 2, 1976, Ser. No. 710,717
Int. Cl.[2] F16H *25/12*
U.S. Cl. 74—57 **23 Claims**



1. A rotary torque actuator comprising:

a unitary, self-contained power section which includes a piston rod and means responsive to fluid media under pressure for imparting linear motion to said piston rod, said piston rod having an axial bore defined therein;

a captive nut connected to said piston rod, said captive nut

including a hollow bore extending axially therethrough and received within said piston rod bore so that said nut bore is located within said piston rod bore, said captive nut further including guide teeth located inside said captive nut to project inwardly of said hollow bore, said piston rod imparting linear movement to said captive nut;

a unitary, self-contained converter section which includes a solid drive shaft rotatably mounted therein for rotary motion, said drive shaft having arcuate guide teeth receiving means defined on the outer surface thereof and being received within and extending through said captive nut hollow bore to extend into said piston rod axial bore, said captive nut guide teeth being received in said drive shaft guide teeth receiving means so that said captive nut linear motion is translated into drive shaft rotary motion as said guide teeth traverse said arcuate guide teeth receiving means; and

connecting means interconnecting said power and converter sections in end-to-end, tandem relationship.

4,089,230

WASTE AND OVERFLOW PLATE ASSEMBLY

Merritt J. Nelson, Sparta, Mich., assignor to Zin-Plas Corporation, Comstock Park, Mich.

Filed Jul. 22, 1976, Ser. No. 707,817
Int. Cl.² F16H *21/26;* E03C *1/23*
U.S. Cl. 74—97 **7 Claims**

1. In a waste and overflow plate assembly having: a face plate having an aperture therethrough; a trip lever positioned through the aperture of the face plate and movable between two pivotable positions with respect to the face plate; the trip lever having a handle and arm portions; means for toggling the trip lever between the two pivotable positions on the face plate, the toggle means including a spring clip having a front leg section and a rear leg section, each of which have a slotted aperture therethrough, and means on an end of the trip lever biasing the spring between an end of the trip lever and the face plate; stabilizing means to prevent rotation of the trip lever with respect to the face plate when the trip lever is seated in a seating means on the face plate but to permit rotation of the trip lever with respect to the face plate when the trip lever is unseated therefrom to facilitate assembly of the trip lever to the face plate; the improvement which comprises:

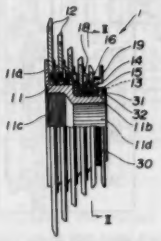
retaining means on the trip lever and spaced sufficiently close to the face plate for preventing withdrawal of the trip lever from engagement with the face plate while facilitating the trip lever toggle between the two pivotable positions wherein the retaining means has a front protuberance transverse to the slotted aperture of the frong leg of the spring clip, the front protuberance has a length greater than the width of the slotted aperture, and the front leg of the spring clip is positioned between the front protuberance and the face plate so that the protuberance abuts the front leg of the spring clip when the trip lever is pulled forward.

4,089,231

MULTISTAGE FREEWHEEL FOR BICYCLES

Takashi Segawa, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Nov. 26, 1976, Ser. No. 745,181
Claims priority, application Japan, Dec. 8, 1975, 50/146774
Int. Cl.² F16H *11/04;* F16D *41/18*
U.S. Cl. 74—217 B **13 Claims**



1. A multistage freewheel for changing the speed of a bicycle by shifting a driving chain through a derailleur, comprising

(a) at least two sprockets, said sprockets having at the outer periphery thereof numerous teeth with each sprocket having a different number and at the center round bores,

(b) a cylindrical support, said support having an outer diameter smaller than an inner diameter of said bore of each of said sprockets and supporting each of said sprockets individually in a rotatable and axially movable relation,

(c) at least two unidirectional rotary transmissions provided between the inner periphery of said round bores of the sprockets and the outer periphery of said support, said rotary transmissions allowing said sprockets to be free-rotatable independent of one another, and

(d) means for applying rotary resistance to said free rotation of said sprockets, said means comprising an elastic member elastically shiftable axially of said support and axially unidirectionally biasing said sprockets, whereby the chain, when shifted by the derailleur, is moved axially of said sprockets to make said sprockets movable in the same direction as the chain motion resulting in increasing the rotary resistance.

4,089,232

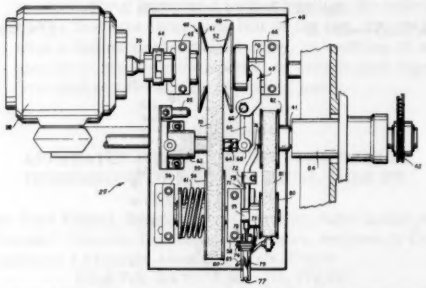
VARIABLE SPEED DRIVE SYSTEM FOR CARDING MACHINE

Lawrence Llach, Canton, and Arturo Picas, Athens, both of Ga., assignors to Canton Textile Mills, Canton, Ga.

Continuation-in-part of Ser. No. 545,195, Jan. 29, 1975, Pat. No. 3,982,301, and a continuation of Ser. No. 605,635, Aug. 18, 1975, Pat. No. 4,027,358. This application Sep. 27, 1976, Ser. No. 726,600
Int. Cl.² F16H *55/52*
U.S. Cl. 74—230.17 F **4 Claims**

1. A variable speed drive system for a textile working machine and the like comprising a motor, a variable pitch drive pulley rotatably driven by said motor including sheave halves movable toward and away from each other, a variable pitch driven pulley for connection to the textile working machine and the like including sheave halves movable toward and away from each other, belt means extending about said drive pulley and said driven pulley for imparting rotational movement from said drive pulley to said driven pulley, spring means mounted against a movable sheave half of one of said pulleys for continuously urging the pulley to a small pitch, lever means pivotally mounted intermediate its ends with one end in engagement with a movable sheave half of the other of said pulleys, lever actuating means in engagement with the other end of said lever for pivoting the said one end of said lever means toward the movable sheave half of the other of said pulleys to reduce the

pitch of the other of said pulleys, and limiting means comprising a non-rotatable cam shaft movable along its length in a direction approximately normal with respect to the movement of said other end of said lever means with an angled cam



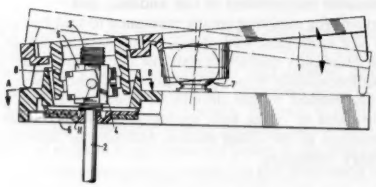
abutment at one end positioned in the path of movement of said other end of said lever means, and means for moving said non-rotatable cam shaft along its length to vary the position of the angled cam abutment with respect to said other end of said lever means.

4,089,233

AUTOMOBILE MIRROR

Walter Sebald, Goppingen, Germany, assignor to Gebr. Marklin & Cie. GmbH, Goppingen, Germany

Filed Aug. 19, 1976, Ser. No. 715,928
Claims priority, application Germany, Oct. 22, 1975, 2515763
Int. Cl.[2] F16H *1/18*
U.S. Cl. 74—424.8 A **3 Claims**



1. An automobile mirror device comprising:
(i) a base;
(ii) a carrier for a mirror glass, said carrier being pivotally mounted on said base for pivotal movement between two end positions;
(iii) a mirror glass carried by said carrier;
(iv) a spring stirrup pivotally carried on said carrier;
(v) a nut comprising two threaded shells, said nut being pivotally carried on said spring stirrup; and
(vi) a threaded spindle causes said carrier to be pivoted, said spring stirrup being adapted to elastically disengage said nut from said spindle when each of said end positions is reached.

4,089,234

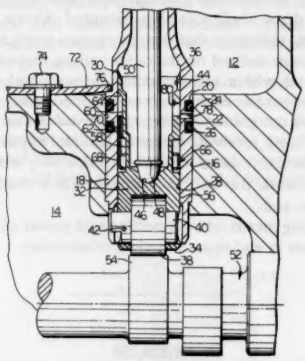
ANTI-ROTATING GUIDE FOR RECIPROCATING MEMBERS

Ralph B. Henson, Creve Coeur, and Noel D. Wiggins, Chillicothe, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 15, 1977, Ser. No. 777,871
Int. Cl.[2] F16H *53/06*
U.S. Cl. 74—569 **5 Claims**

1. An anti-rotating guide for a reciprocating member comprising:

a spool member reciprocally mounted within a bore, the spool having a first groove radially annularly formed therein adjacent the bore and an elongated second groove including a first end communicating with the first groove and extending therefrom substantially axially along the spool adjacent the bore and terminating within the bore at a closed second end; and



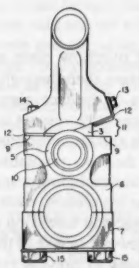
a retainer mounted on the spool, the retainer having an annular radially flexible first portion of the retainer in the first groove being of a construction sufficient to be compressed by the bore and an elongated second portion of the retainer extending along the second groove and terminating therein.

4,089,235

INTRA-ARTICULATE CONNECTING ROD FOR SMALL ENGINES

Edward Milton McWhorter, 6931 Greenbrook Cir., Citrus Heights, Calif. 95610

Filed Jun. 7, 1976, Ser. No. 693,887
Int. Cl.[2] G05G *1/00*
U.S. Cl. 74—579 E **1 Claim**



1. A connecting rod constructed in two principal parts comprising upper and lower portions, said upper portion having a boss for holding a piston wrist pin, an arm connecting said boss to a second knuckle pin boss, a resilient material fixedly attached to the said upper portion at two points which are located on each side of the said knuckle pin boss, said knuckle pin boss positioned between two knuckle pin journals fixedly attached to the said lower portion of said connecting rod, a knuckle pin passing through and extending transversely between said knuckle pin journals and also passing through said knuckle pin boss, thus pivotally connecting said upper portion and said lower portion of said connecting rod, said resilient material contacting shoulders on the said lower portion of said connecting rod on alternate pivot positions of said pivotally attached upper and lowr portions of said connecting rod, a

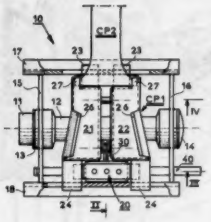
large journal and journal cap on the said lower portion of said connecting rod for rotatively mounting on a crankpin.

4,089,236

SAFETY CONNECTION BETWEEN BICYCLE PEDAL AND SHOE

Claude Genzling, 15 avenue des Cedres, 92410 Ville d'Avray, France

Filed May 12, 1976, Ser. No. 685,633
Claims priority, application France, May 13, 1975, 75 14835
Int. Cl.² G05G *1/14*; B62M *3/08*
U.S. Cl. 74—594.4 **15 Claims**



1. In a bicycle, a pedal having a transverse shaft adapted to be connected at one end to a rotary propelling crank of the bicycle, and said pedal also having a support means carried by and freely turnable on said shaft, connecting means situated at least in part over said shaft for connecting to the pedal a shoe worn by a cyclist during operation of the bicycle, said support means supporting said connecting means for movement with respect to the pedal between a holding position holding the shoe connected to the pedal and a release position releasing the shoe from the pedal, and force-responsive means acting on said connecting means for maintaining the latter in said holding position thereof while the cyclist acts with normal forces through the shoe on the pedal during normal operation of the bicycle, said force-responsive means responding automatically to abnormal forces exerted by the cyclist through the shoe on the pedal for providing for displacement of said connecting means to said release position by the shoe, said connecting means including a pair of jaws extending over said shaft and adapted to engage opposite sides of the sole plate, said support means supporting said jaws for movement independently of each other laterally of the pedal toward and away from each other, and said force-responsive means including a spring means operatively connected with said jaws for urging them toward each other with a predetermined force.

4,089,237

CHANGE SPEED TRANSMISSION IN RANGE-TYPE DESIGN FOR MOTOR VEHICLES

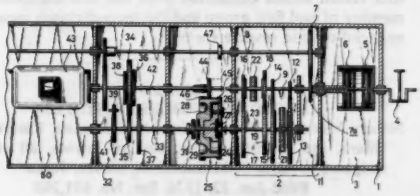
Helmut Scholz, Delrath, Germany, assignor to International Harvester Company, Chicago, Ill.

Filed Apr. 26, 1976, Ser. No. 680,250
Claims priority, application Germany, Apr. 25, 1975, 2528528
Int. Cl.² F16H *37/06*
U.S. Cl. 74—681 **7 Claims**

1. Change-speed transmission for motor vehicles, in particular for use in agricultural and industrial types of tractors having an engine, a gear-shift transmission unit, an intermediate drive transmission unit, and a range-shift transmission unit having at least two forward speed ranges and one reverse speed, characterized by:

the intermediate drive unit having a planetary drive arrangement whereby the planetary gear ring is driven externally by means selectively connectable to a power source, and the sun gear of the planetary drive is connected to a first countershaft forming a part of the gear-shift transmission unit and is driven thereby, and the planetary gear carrier of the planetary drive is connected to and drives a second countershaft forming a part of the range-shift transmission unit; and,

the selectively connectable means comprising a sliding tubular gear means sleeved over a power output shaft of the range-shift transmission unit, and an external gear ring portion around the circumference of the planetary gear



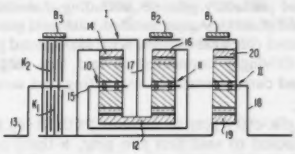
ring, the gear means and the output shaft each having mating splined portions in one axial moved position of the gear means along the output shaft and the gear means meshing with the gear ring portion in the one axial position for transferring power from the range-shift transmission to the planetary gear ring in a selected one of the two forward speed ranges.

4,089,238

PLANETARY GEAR CHANGE-SPEED TRANSMISSION, ESPECIALLY FOR MOTOR VEHICLES

Hans-Joachim M. Förster, Stuttgart-Riedenberg; Wolfgang Zaiser, Althutte Kr. Welzheim, and Werner Hensel, Berkheim, uber Esslingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Division of Ser. No. 702,238, Feb. 1, 1968, abandoned. This application Mar. 13, 1973, Ser. No. 340,882
Claims priority, application Germany, Feb. 3, 1967, 1555205
Int. Cl.² F16H *57/10*
U.S. Cl. 74—759 **47 Claims**



1. A four-speed planetary gear change-speed transmission, especially for motor vehicles, in which all four forward speeds can be engaged without group change, and which includes a first group of planetary gear set means having an output member, a plurality of rotating elements effectively providing three forward speeds and a reverse speed including sun, ring and planet gears as well as at least one planet carrier, one of said rotating elements forming an input member for all of said three forward speeds and another one of said rotating elements forming an input member for the reverse speed, each sun gear being rotatable independently of any other sun gear in the first group of planetary gear set means, and two clutch means enabling each input member to be connected either selectively or both together with the driving engine, wherein the improvement comprises a second group of planetary gear set means providing another forward speed forming the first speed of the transmission and consisting of a plurality of rotatable elements including a sun gear, a ring gear, and at least one planet gear arranged on a planet gear carrier, one of the rotatable elements of the second group forming an output member operatively connected for common rotation with the output member of the first group, a second rotatable element of the second group being adapted to be braked to obtain the first speed of the

transmission with said first-mentioned input member connected with the driving engine by way of the first one of said clutch means, and a third rotatable element of the second group being operatively connected for positive rotation in unison with a rotatable element of the first group other than the output member and the another input member, the drive in all four forward speeds taking place by way of the engaged first clutch means connected with the first-mentioned input member of said first group and the second clutch means being engaged only in reverse speed.

4,089,239

SPEED CHANGE GEAR SYSTEM

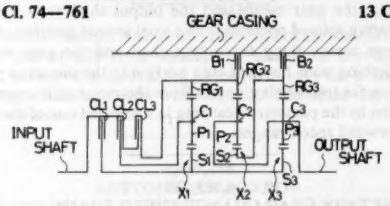
Noboru Murakami, Nagoya; Koichiro Hirosawa, Kariya; Kazuo Ohara, and Koichi Matsuo, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Jan. 22, 1976, Ser. No. 651,259

Claims priority, application Japan, Feb. 7, 1975, 50-16497

Int. Cl.[2] F16H *3/44, 57/10*

U.S. Cl. 74—761 **13 Claims**



1. A speed change gear system comprising:

an input shaft;

an output shaft;

a first planetary gear set including a first sun gear, a first planetary gear meshed with said first sun gear, a first ring gear meshed with said first planetary gear, and a first carrier rotatably supporting said first planetary gear;

a second planetary gear set including a second sun gear, a second planetary gear meshed with said second sun gear, a second ring gear meshed with said second planetary gear and drivingly connected to said first ring gear, and a second carrier rotatably supporting said second planetary gear;

a third planetary gear set including a third sun gear drivingly connected to said first sun gear, a third planetary gear meshed with said third sun gear, a third ring gear meshed with said third planetary gear and drivingly connected to said second sun gear, and a third carrier rotatably supporting said third planetary gear and drivingly connected to said second carrier and said output shaft;

clutch means for selectively coupling said first and third sun gears, said first carrier, and said first and second ring gear to said input shaft; and

brake means actuatable for selective engagement with said first and second ring gears, said second sun gear and said third ring gear.

4,089,240

POWER TONGS

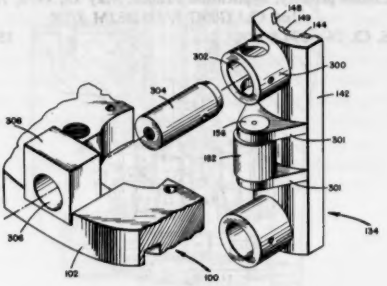
Emery Lee Eckel, Odessa, Tex., assignor to Eckel Manufacturing Co., Inc., Odessa, Tex.

Filed Jun. 22, 1976, Ser. No. 698,324

Int. Cl.[2] B25B *17/00*

U.S. Cl. 81—57.18 **10 Claims**

1. A power tong for rotating a pipe comprising a frame having a throat for receiving a pipe, a partial ring rotatably mounted on said frame and having an opening therein which is adapted to be aligned with said throat so that a pipe may be positioned within said partial ring, the inner surface of said partial ring including arcuate depressions which define cam surfaces positioned on opposite sides of the center of said opening, means for rotating said partial ring about its central axis, a die carrier mounted on said tong for rotation relative to said partial ring, a pair of die means connected to said die carrier, a cam follower carried by each of said die means and projecting into said arcuate depressions of said partial ring so that, upon rotation of said partial ring relative to said die carrier in either direction, said die means are moved closer to the



axis of rotation of said ring, pipe-gripping dies mounted on said die means in position to engage a pipe positioned within said partial ring and guide means mounted on said die carrier axially spaced from said cam followers for causing said die means to move rectilinearly, said guide means comprising a guide passage, and a guide rod slidably mounted within said guide passage, one end of said guide rod connected to said die means whereby said die means are moved rectilinearly.

4,089,241

AUTOMATIC TURRET LATHE

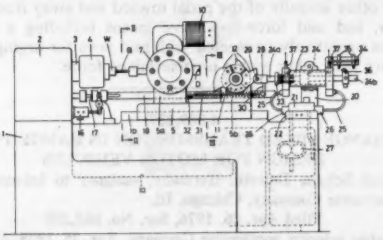
André Bechler, 4, rue Centrale, 2740 Moutier (Canton of Berne), Switzerland

Filed Apr. 15, 1977, Ser. No. 788,038

Claims priority, application Switzerland, Apr. 20, 1976, 4931/76

Int. Cl.[2] B23B *21/00*

U.S. Cl. 82—21 A **5 Claims**



1. In an automatic lathe of the type comprising a bed, a rotary work spindle, a carriage movable parallel to the axis of rotation of said spindle, a tool turret mounted on said carriage and indexable about an axis perpendicular to the axis of rotation of said spindle, a continuously rotatable control rotor mounted on said carriage and bearing radial cam elements, and a support member mounted on said bed, said cam elements coming to rest upon said support member for controlling advancing movements of said carriage, the improvement comprising:

a control device including a movable part integral with said support member and

control means for causing said support member to effect controlled rectilinear movements parallel to the axis of

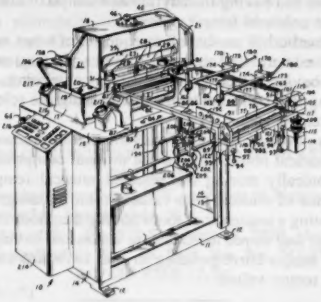
rotation of said spindle during the operating cycle of said lathe.

4,089,242

METHOD AND APPARATUS FOR FORMING GASKETS AND THE LIKE

James T. Gramling, 10312 W. 48th Ter., Shawnee, Kans. 66203

Filed Dec. 22, 1975, Ser. No. 642,766
Int. Cl.[2] B26D 7/06
U.S. Cl. 83—95 14 Claims



1. Apparatus for successively forming a plurality of like parts from a strip of relatively thin, stock sheet material, said apparatus comprising:

a frame;

a pair of vertically spaced dies supported on said frame, one of said dies being adapted for reciprocal movement toward and away from the other said die;

a cutting tool mounted on one of said dies, said cutting tool including cutting edges shaped in the outline of said part and adapted to cut the stock material to form said part upon movement of said dies together whereby said part is maintained with said stock material;

power means for periodically forcing said dies together;

knockout means located downstream and remote of said dies and intermittently operable to knock the parts out of said stock material; and

a tensioning and feed mechanism on said frame to maintain the stock material in tension across said dies and said knockout means and to periodically and intermittently advance the stock material in preselected length increments, whereby a part cut in said stock material by said cutting tool is advanced from said dies by said feed mechanism to said knockout means where the part is removed from said stock material.

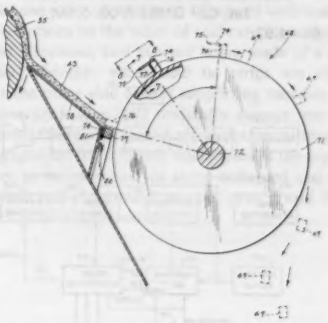
4,089,243

CHEESE MAKING APPARATUS

Gretz L. Hazen, Fort Atkinson, Wis., assignor to DEC International, Inc., Madison, Wis.

Filed May 6, 1976, Ser. No. 683,830
Int. Cl.[2] B26D 3/24, 1/38
U.S. Cl. 83—161 4 Claims

1. A curd mill, comprising a drum mounted for oscillating movement about its axis, means to deliver a mat of curd to the drum and including a supporting surface terminating adjacent the periphery of said drum, the width of the curd mat being generally parallel to the axis of the drum, curd cutting means mounted on the drum and including a blade extending generally parallel to the axis of the drum and spaced from the periphery of the drum to cut a strip from the end of the curd mat, and having a series of generally parallel knives interconnecting the blade and the periphery of the drum, said cutting means being mounted for cooperating cutting action with said surface, drive means for oscillating the drum between an inoperative position to an operative position wherein said cutting means cooperates with said surface to cut said mat into a plurality of cube-like chunks, said operative position being located on one side of a vertical plane extending through the axis of the drum



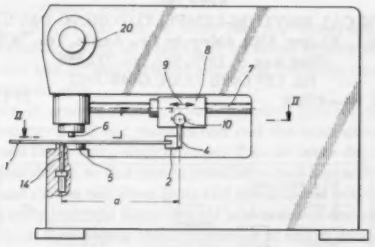
and said inoperative position being located at a higher level than said operative position and on the opposite side of said vertical plane, and means for discharging said chunks outwardly from the periphery of the drum when said drum is in the inoperative position.

4,089,244

STAMPING OR NIBBLING MACHINE HAVING A WORKPIECE FEED OPERABLE IN ACCORDANCE WITH THE WEIGHT AND CENTER OF GRAVITY OF THE WORKPIECE

Eugen Herb, and Hubert Bitzel, both of Ditzingen, Germany, assignors to Trumpf Maschinen AG, Switzerland

Filed Aug. 2, 1976, Ser. No. 710,370
Claims priority, application Germany, Aug. 16, 1975, 2536525
Int. Cl.[2] B23D 27/00; B26D 5/00
U.S. Cl. 83—220 6 Claims

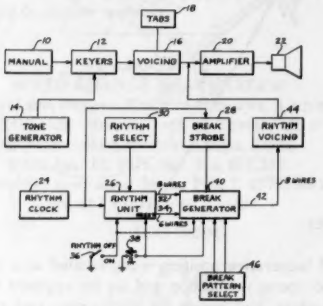


1. A stamping or nibbling machine, comprising punch drive means for reciprocating a punch into and out of engagement with a workpiece, workpiece drive means for displacing the workpiece, longitudinal and transverse guide means guiding said workpiece for longitudinal and transverse movement, a centering clamp for each of said longitudinal and transverse guide means, a torque meter connected to each of said longitudinal and transverse guide means for measuring the moment at the longitudinal and transverse guide means, and a controller connected to said torque meters and said punch and workpiece drive means for selectively adjusting the number of strokes of the punch and for varying the velocity of displacement of the workpiece in accordance with said torque meters.

4,089,245
BREAK GENERATOR

Ralph Nowack Dietrich, Jasper, Ind., assignor to Kimball International, Inc., Jasper, Ind.

Filed Oct. 12, 1976, Ser. No. 731,703
Int. Cl.[2] G10H 1/00, 5/00
U.S. Cl. 84—1.03 12 Claims



1. A method for producing rhythm breaks in electronic organs comprising:

providing on a first output line a selected main rhythm pattern from a plurality of stored main rhythm patterns,

providing on a second output line a selected rhythm break pattern from a plurality of stored rhythm break patterns,

providing sequential rhythm beat signals which are in synchronism with the main rhythm pattern,

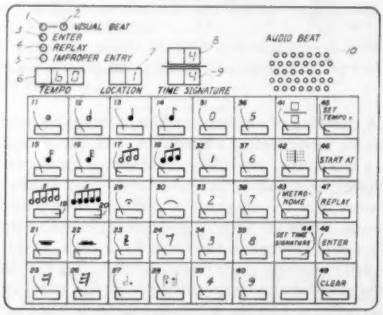
selectively generating a rhythm break control signal,

normally establishing a connection between the first output line and the voicing circuitry for developing shaped wave forms for supply to percussion sound output circuitry, and alternatively for interrupting the connection between the first output line and the voicing circuitry while establishing a connection between the second output line and the voicing circuitry for a selected number of rhythm beat signals when the break control signal is generated.

4,089,246
MUSICAL RHYTHM-TEMPO TUTORING DEVICE

Stephen L. Kooker, 3301 Aldwyche Dr., Austin, Tex. 78704

Filed Aug. 9, 1976, Ser. No. 712,866
Int. Cl.[2] G09B 15/04; G04F 5/02
U.S. Cl. 84—470 R 37 Claims



1. A musical rhythm-tempo tutoring device comprising:

a housing;

a keyboard mounted on said housing and including numerical switch means each corresponding to different digits and selectively operable to input a musical tempo value;

said keyboard further including a plurality of musical note switch means each corresponding to different musical note values and selectively operable to enable the operator to input a predetermined sequence of musical note values of a musical composition;

means responsive to said numerical switch means for sequentially storing said tempo value and said predetermined sequence of musical note values; and

means for producing a sequence of tones having durations and spacings corresponding to said stored musical note values and having the rhythm and tempo of said keyboard input note and tempo values.

33. A method of producing a sequence of tones corresponding to a predetermined sequence of notes of a musical composition and having selected tempo values comprising:

entering through a keyboard in a housing the selected musical tempo value;

entering through said keyboard the predetermined sequence of musical note values of the musical composition;

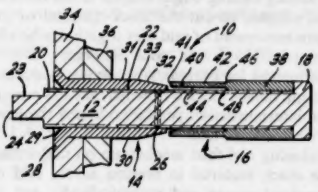
electronically storing the selected musical tempo and sequence of musical note values in said housing; and

generating a sequence of tones having durations corresponding to said stored musical note values and having a rhythm and tempo corresponding to said keyboard entered note and tempo values.

4,089,247
BLIND FASTENER

Warren F. Dahl, Philadelphia, and Richard C. Landt, Souderton, both of Pa., assignors to Standard Pressed Steel Co., Jenkintown, Pa.

Filed Jun. 25, 1976, Ser. No. 699,926
Int. Cl.[2] F16B 31/02
U.S. Cl. 85—70 41 Claims



1. A blind fastener assembly for installation in a workpiece having an opening therein, said assembly comprising:

a pin member having an enlarged head at one end thereof, an elongated shank portion and means on said shank portion operative to advance said pin member in a direction along its longitudinal axis;

expander means having an enlarged head at one end thereof formed to bear upon an accessible surface of the workpiece, a tapered surface of varying radial thickness in a longitudinal direction adjacent the other end thereof, said tapered surface varying from a minimum radial thickness at said other end to a maximum radial thickness at a locus of points spaced from said other end, and a shank portion intermediate said enlarged head and said tapered surface, said shank portion having an outer surface formed to be placed in the workpiece opening, and an internal bore extending through said expander means carrying said pin member shank portion; and

expandable sleeve means carried on said pin member shank portion proximate said enlarged head, said sleeve means including a first portion of greater radial thickness adjacent one end thereof proximate said pin member enlarged head and a second portion of reduced radial thickness adjacent the other end thereof juxtaposed from said mini-

mum thickness end of said expander means tapered surface, said second portion having a reduced radial distance to the outside surface thereof and an increased radial distance to the inside surface thereof each relative to the radial distance to the respective outside and inside surfaces of said first portion, whereby there is a discontinuity in the outside surface and in the inside surface of said sleeve means at the junction of said first and said second portions, said sleeve second portion being adapted to be advanced along said expander tapered surface and said expander outer surface and expanded thereover upon advancement of said pin member toward a blind side surface of the workpiece, said other end of said sleeve means ultimately contacting the blind side workpiece surface and forming a radially outwardly extending bulb with its apex intermediate the ends of said second portion, said bulb bearing against the blind side workpiece surface.

4,089,248

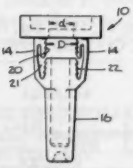
SELF-LOCKING UNITARY MOLDED PLASTIC FASTENER

Bernard Anscher, Woodbury, N.Y., assignor to National Molding Corporation, Farmingdale, N.Y.

Continuation of Ser. No. 579,546, May 21, 1975, abandoned. This application Nov. 15, 1976, Ser. No. 742,074

Int. Cl.² F16B *13/04*

U.S. Cl. 85—71 **4 Claims**



1. A one-piece deformable plastic fastener which includes:

(a) an upper body portion having an axially extending internal bore therethrough;

(b) a lower portion having an internal bore therein in axial alignment with said internal bore through said upper body portion;

(c) the bore through said lower portion being narrower than the bore through said upper body portion, said bore adapted for self-threading co-action with a threaded member to be inserted through the bore of said upper body portion and threaded into the bore of said lower portion;

(d) a pair of opposed tie strips joining said upper body portion and said lower portion, said tie strips having a taper formed therein, said fastener adapted for insertion through an opening in a supporting member such that said upper body portion will be disposed adjacent one side of said supporting member and whereby a threaded member may be inserted and threaded into the bore in said lower portion to draw it toward said upper body portion thereby causing axial collapsing deformation of said tie strips and outward movement of a portion thereof to bring said tie strips into engagement with the other side of said supporting member as said threaded member is turned into the bore of said lower member;

(e) said lower member having a first circumferentially continuous cylindrical axial extension extending axially upward above the point of attachment with said tie strips and internal of said tie strips;

(f) said upper body portion having a second circumferentially continuous cylindrical axial extension extending downward in a direction toward said lower portion from the point of attachment of said tie strips thereto, the internal diameter of said second axial extension being approximately equal to the outside diameter of said first axial extension;

(g) a plurality of axially spaced serrations on the inside of said second axial extension or the outside of said first axial extension; and

(h) at least one projection in axial alignment with said plurality of serrations on the other of said extensions for engaging said serrations, said fastener being made of a resilient material whereby, when said tie strips are collapsed against the other side of said supporting member, said at least one projection will resiliently engage one of said serrations, the axially spaced serrations permitting a locking engagement for differing thicknesses of the supporting member to maintain said tie strips collapsed and in abutment with said supporting member even if said threaded member is later withdrawn.

4,089,249

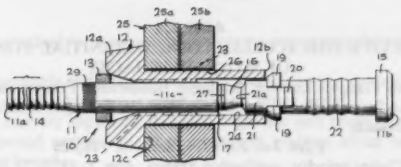
HOLE FILLING BLIND RIVET

Lloyd S. Binns, 10220 Warner Ave., Fountain Valley, Calif. 92708

Filed Sep. 27, 1976, Ser. No. 727,287

Int. Cl.² F16B *13/06*

U.S. Cl. 85—72 **8 Claims**



1. In a blind rivet of the type having a sleeve and a mandrel, the improvement wherein:

said mandrel has one or more laterally projecting sleeve expanding lugs all situated at locations spaced from the rear end of said mandrel and being frangibly connected thereto, and

a set of annular flutes on said mandrel between said lug locations and said mandrel rear end, the outer diameter of said flutes being slightly larger than the inner diameter of said sleeve, so that during installation said lugs will expand said sleeve, will shear from said mandrel and will translate axially past said flutes toward said mandrel rear end, said flutes then urging radial expansion of said rivet sleeve to accomplish hole filling, and wherein:

the interior of said sleeve is counterbored from the rear end thereof, said flute outer diameter being slightly larger than the inner diameter of said sleeve counterbored portion,

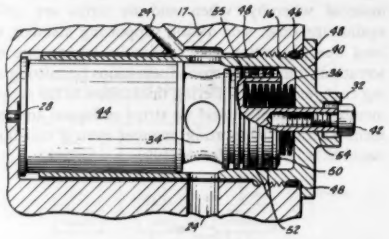
the interior of said sleeve forward of said counterbored portion having generally axially aligned, readily deformable splines with an inner diameter less than that of said counterbored portion, said mandrel having an annularly continuous shoulder forward of said flutes, the outer diameter of said shoulder being greater than said inner diameter of said spines, said lugs all projecting laterally from said shoulder, said shoulder collapsing said splines during rivet installation as said flutes urge expansion of the counterbored portion of said sleeve.

4,089,250

CARTRIDGE HOLDER WITH EXTRACTOR/INDICATOR

Thaddeus Jakubowski, Jr., Long Beach, and Herman R. Kietzman, Jr., Cypress, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Feb. 24, 1977, Ser. No. 771,451
Int. Cl.[2] B64D 1/06
U.S. Cl. 89—1.5 F 3 Claims



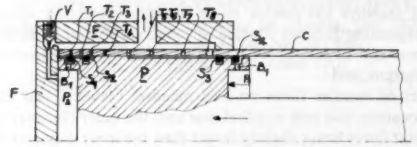
1. An improved holder to retain an explosive cartridge in a breech comprising:
a cylinder substantially closed on one end, the opposite open end designed to be received into the breech, said cylinder having an enlarged internal diameter at the open end and gas escape ports near the closed end;
a spool sized to fit within the cylinder;
indicator means attached to the spool observable at the closed end of the cylinder;
spring means to bias the spool toward the open end of the cylinder and force the cartridge from the holder and to bias the indicator means into the cylinder.

4,089,251

DEVICE FOR ACCELERATING THE INITIAL STROKE OF HYDRAULIC JACKS

Jean François Louviot, Boulogne Billancourt, France, assignor to Regie Nationale des Usines Renault, Boulogne Billancourt, France

Filed Jul. 30, 1976, Ser. No. 710,325
Claims priority, application France, Aug. 1, 1975, 75 24185
Int. Cl.[2] F15B 15/22
U.S. Cl. 91—26 2 Claims



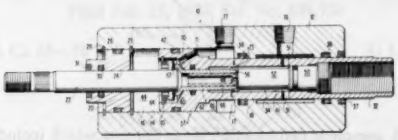
1. A device for controlling the acceleration and deceleration strokes of a hydraulic cylinder, comprising a cylinder having a casing defining a bore and end members surrounding end portions of the casing and closing the bore, a piston slidably mounted in the casing bore and having end parts, a side wall interconnecting the end parts, and peripheral grooves in its side wall near both end parts, sealing rings positioned in said grooves, at least one radial port formed in each piston end part, a damping chamber formed at each end of the cylinder casing between each cylinder casing end member and piston end part, a fluid conduit means for feeding and exhausting fluid from each of said damping chambers and said cylinder casing, fluid feed and exhaust orifices in the surrounded end portions of the cylinder casing forming a plurality of axially distributed calibrated ports arranged in rows in the cylinder casing at both ends thereof, annular fluid feed chambers formed between the surrounded ends of the casing and the end members and communicating with outer ends of said plurality of calibrated ports, the annular fluid feed chambers communicating with said fluid conduit means, orifice sections formed in both of the cylinder end members for communication between one of the annular fluid feed chambers and one of said damping chambers, and needle point screws positioned in each of said orifice sections for controlling the size of said orifice sections, at least one of said sealing rings at each end of said piston being mounted in its respective groove with a certain amount of axial and lateral clearance, wherein said groove has one side communicating with one of said damping chambers through the at least one radial port in the piston end part and is adapted during movement of the piston to communicate successively at the opposite open side of the groove with the plurality of axially distributed calibrated ports in said cylinder casing thereby varying the size of the opening connecting said annular fluid feed chambers with respective ones of said damping chambers.

4,089,252

PROPORTIONAL FORCE AMPLIFIER

Kishor J. Patel, Hales Corners, and Allen J. Carlson, Milwaukee, both of Wis., assignors to Applied Power, Inc., Milwaukee, Wis.

Filed Jan. 21, 1977, Ser. No. 761,193
Int. Cl.[2] F15B 15/17, 9/10
U.S. Cl. 91—49 9 Claims



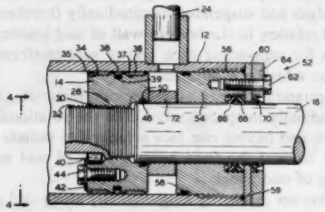
1. A proportional force amplifier comprising:
(a) a housing having a working chamber therethrough, a pressure port, and a tank port leading to said working chamber;
(b) a hollow output displacement rod slidably received in one end of said housing and having an outer surface;
(c) a plug member disposed in said output rod intermediate the length of said rod;
(d) a seal between the outer surface of said displacement rod and the wall of said working chamber between said pressure and tank ports;
(e) a piston at an inner end of said output rod dividing said work chamber into a control chamber and a pressure chamber, the latter being in communication with said pressure port;
(f) an input displacement rod extending into said control chamber;
(g) a hollow adapter extending into said output rod, said adapter having a nozzle juxtaposed near said plug member;
(h) means affixing said adapter to said input rod for longitudinal movement therewith;
(i) first orifice means extending through said piston and providing communication between said pressure chamber and said control chamber; and
(j) second orifice means between said control chamber and said tank port defined by a spacing between said adapter and said plug member to effect a null position when said second orifice means develops an equal force on either side of said piston.

4,089,253

LINEAR FLUID MOTOR

Peter J. Visser, Niles, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Dec. 1, 1976, Ser. No. 746,450
Int. Cl.[2] F16J *15/18, 1/14*
U.S. Cl. 92—168 **6 Claims**



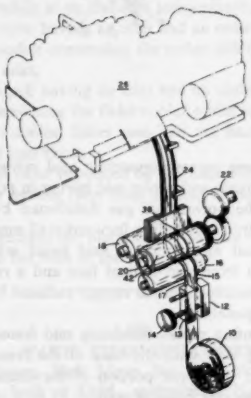
1. A linear fluid motor comprising an outer cylinder member, a piston of circular cross section movable reciprocally within said cylinder member in sealing relation therewith, a piston rod secured to the said piston by a screw connection comprising internal threads on the piston and mating external threads on the piston rod, the said two sets of threads being proportioned and dimensioned to allow pivotal movement of said piston rod relative to said piston during reciprocation through a pivot angle sufficient to exceed a predetermined crookedness angle between said piston and said rod dependent upon the manufacturing tolerances for the piston and the rod.

4,089,254

STRIP MATERIAL FEED ROLLER ASSEMBLY

Alan L. Kindig, Holland, Mich., assignor to General Electric Company, Fort Wayne, Ind.

Filed Dec. 20, 1974, Ser. No. 535,101
Int. Cl.[2] B65G *39/07*; H02K *15/10*
U.S. Cl. 93—1 R **7 Claims**



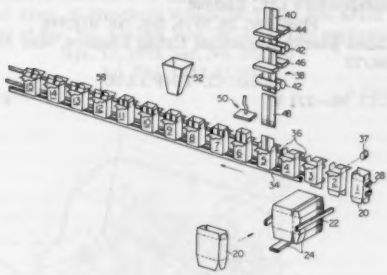
1. In an improved apparatus for making a magnetic core slot insulator, wherein the apparatus comprises a machine frame, insulator fabricating means supported by the machine frame for forming strip pieces of insulation for insertion into slots of a magnetic core, and material feeding means having at least one roller assembly cooperating with at least one other roller to move insulator material, the improvement comprising: the at least one roller assembly having a first portion and a second portion, and a resilient sleeve for pinching the insulator material against the other roller; the first portion having an abutment against which the resilient sleeve is compressed in an abutting relationship; the second portion having threads thereon; and movable means movable axially along the second portion and threadedly mated with at least some of the threads of the second portion for compressing the resilient sleeve against the abutment of the first portion and for controlling the outer diameter of the resilient sleeve; movement of the movable means in a direction to increase compression of the resilient sleeve causing an increase in outer diameter of the resilient sleeve whereby compensation is made for wear of the resilient sleeve.

4,089,255

METHOD FOR MAKING A BAG-IN-CARTON

Shigeichi Akoh, Yotsukaido; Hiroo Harada, Kyoto; Yutaka Ueda, and Masao Kurosawa, both of Tokyo, all of Japan, assignors to Honshu Seishi Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 16, 1976, Ser. No. 714,962
Claims priority, application Japan, Jul. 16, 1976, 51-84551
Int. Cl.[2] B31B *7/00*
U.S. Cl. 93—36.01 **3 Claims**



1. A method for making a bag-in-carton comprising the steps of:

successively and intermittently advancing cartons, the upper flaps of which are opened, along a given path;

successively supplying flattened bags into said respectively opened cartons at a bag supplying position along said path; and

blowing up the bags in said cartons at a bag blowing position downstream from said bag supplying position along said path, said blowing up procedure including:

opening the unsealed end of said bag by vacuum horns;

covering said opened end with a baffle plate; and

supplying air to said bag through a duct extending through said baffle plate.

4,089,256

WIND DEFLECTOR FOR AN AUTOMOTIVE VEHICLE

James F. Furcini, 4017 N. 59th Dr., Phoenix, Ariz. 85033

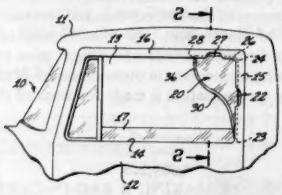
Continuation-in-part of Ser. No. 576,788, May 12, 1975, abandoned, and a continuation-in-part of Ser. No. 521,634, Nov. 7, 1974, abandoned. This application Dec. 1, 1976, Ser. No. 746,416
Int. Cl.[2] B60J *1/20*
U.S. Cl. 98—2.12 **10 Claims**

1. A wind deflector panel for use in the side window opening of a truck comprising in combination:

a. a truck having at least one side window opening in which a window glass is movably mounted and which is defined by top and rear window frame members; and

b. a wind deflector panel mounted within the window opening of said truck in juxtaposed parallel relationship with respect to the movement path of the window glass, said panel of generally triangular configuration and having a rear edge affixed to the rear window frame member and extending substantially along the length thereof and having a top edge affixed to the top window frame member

with said top edge having a length which is one half of the length of said rear edge, said panel having a leading edge



which extends between the forwardmost end of said top edge and the lowermost end of said rear edge.

4,089,257

VENTILATION GRILLE OR GRATING

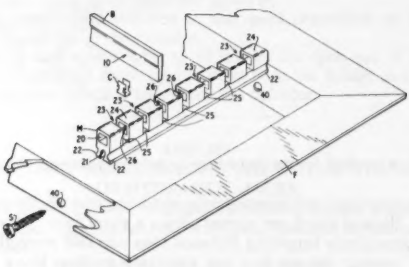
James Dunne, Merseyside, England, assignor to Engineers & Metalworkers Ltd., England

Filed Apr. 26, 1976, Ser. No. 679,949

Claims priority, application United Kingdom, May 30, 1975, 23566/75

Int. Cl.[2] F24F *13/00*

U.S. Cl. 98—121 R **4 Claims**



1. A ventilating grille comprising:

(i) a plurality of blades of generally rectangular cross-section disposed parallel in spaced relationship,

(ii) a plurality of mullions disposed parallel in spaced relationship, each said mullion having a plurality of transverse slots in each of which a respective blade is received, each mullion being of generally rectangular cross-section and having a rectangular through bore opening into said slots,

(iii) a plurality of spring clips disposed one in each said slot, each spring clip being of "U" section and formed at each side of each leg with inwardly directed barbs, the extremity of each leg being outwardly curved and located just below the adjacent upper edge of said bore, the width of each clip being less than the width of said bore, said leg extremities abutting against the adjacent upper edge of the bore to retain the clip in the mullion, said barbs engaging into the blade to prevent withdrawal of the blade from the clip.

4,089,258

GAS FIRED BARBECUE UNIT

Bernard B. Berger, Aiken, S.C., assignor to Ducane Heating Corporation, Columbia, S.C.

Filed Aug. 29, 1975, Ser. No. 608,909

Int. Cl.[2] A47J *27/026*

U.S. Cl. 99—339 **9 Claims**

1. In a portable gas-fired cooking unit having a housing with upstanding walls at the rear and on each side thereof and horizontally extending walls across the top and bottom thereof to define a cooking area and a food holding spit mounted on said housing for rotation within said cooking area adjacent to the front thereof, the improvement which comprises:

a. A ledge on each sidewall extending forwardly from said rear wall and projecting inwardly into said cooking area, said ledges being arranged in spaced apart opposing relationship;

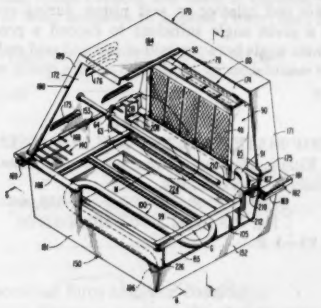
b. An elongated platform having an end adjacent to each of said ledges and suspended longitudinally therebetween in spaced relation to the bottom wall of said housing;

c. Means for supporting each end of said platform on the ledge to which it is adjacent;

d. An upstanding panel of refractory material extending longitudinally in spaced relation to the rotational axis of said spit and having one face arranged to radiate thermal energy toward the food holding area of said spit upon heating of said panel;

e. A gas burner extending longitudinally along said platform and having port means for distributing gas to be burned thereabove;

f. Support means attached to said platform for detachably mounting said gas burner upon said platform;



g. Vertical frame means supporting said refractory panel within said frame and above said burner in position to be heated by the burning of gas distributed by said port means, said frame including forward wall means for preventing lateral movement of said panel while passing cooking heat from said radiant face and a rear wall arranged to intercept thermal energy radiated by the other face of said panel;

h. Upper mounting means mounting said frame upon said rear housing wall with the base of the frame over the platform and the upper portion of the frame in spaced relation to the rear housing wall;

i. Means for mounting the base of said frame upon said platform comprised of an element on said frame and an element carried by said platform with said elements cooperating to support the base of said frame in spaced relation to the rear housing wall, both of said frame mounting means restraining lateral movement of the frame and said upper mounting being detachable from said rear housing wall and said base mounting means being detachable from said platform upon vertical movement of the frame within the cooking area beneath said top housing wall; and

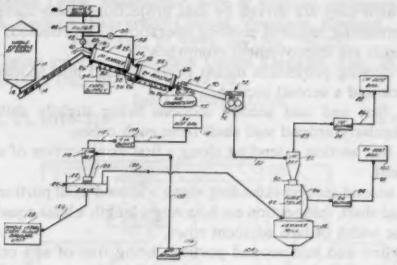
j. Conduit means for supplying flammable gas to said burner.

4,089,259

CORN FLOUR MILLING

Daniel T. Stickle, deceased, late of Dallas, Tex., and by Hortencia Martinez Stickle, executrix, 4332 Millcreek Rd., Dallas, Tex. 75234

Filed Nov. 3, 1975, Ser. No. 628,106
Int. Cl.[2] A23P *1/00*; B02B *5/00*; B02C *4/06*
U.S. Cl. 99—355 14 Claims



12. Apparatus for making flour from whole corn kernels, the apparatus comprising:

an elongated cylindrical drum having an inlet at one end and an outlet at the other end; means supporting the drum with the longitudinal axis tilted from the horizontal, with the inlet end higher than the outlet end;

means for introducing whole kernels of corn into the drum through the inlet;

means for flowing hot gases through the drum in direct contact with the kernels;

means for rotating the drum about its longitudinal axis to cause the kernels in it to be tumbled through the hot gases and moved to the drum outlet;

a roller mill having an inlet and an outlet;

means connecting the drum outlet to the roller mill inlet so that heated corn kernels are fed into the roller mill inlet, squeezed into flakes and discharged from the roller mill outlet while at an elevated temperature;

a flake cooler having an inlet and an outlet;

a flake conduit connecting the roller mill outlet to the flake cooler inlet;

a hammermill having an inlet and an outlet;

means connecting the flake cooler outlet to the hammermill inlet so cooled flakes pass into the hammermill and are ground into flour,

a sieve for flour produced by the hammermill,

means for feeding flour from the hammermill onto the sieve, and

means directing the material not passing through the sieve back to the inlet to the hammermill.

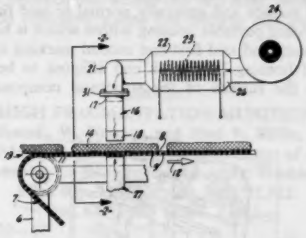
4,089,260

PATTY FINISHING COOKER

John S. Brown, Half Moon Bay, and Robert B. Forney, Sausalito, both of Calif., assignors to N.P.I. Corporation, Burlingame, Calif.

Filed Jan. 7, 1977, Ser. No. 757,745
Int. Cl.[2] A47J *37/00*
U.S. Cl. 99—386 6 Claims

1. A patty finishing cooker for a patty of a predetermined transverse dimension comprising a frame, a conveyor, means for supporting and advancing said conveyor on said frame in a predetermined direction, a nozzle having an elongated outlet opening of a width substantially less than said predetermined transverse dimension, means for mounting said nozzle on said frame with said nozzle directed toward said conveyor and with said elongated outlet substantially parallel to said predetermined direction, and means for discharging a jet of hot air from said outlet toward and against a transversely narrow portion of



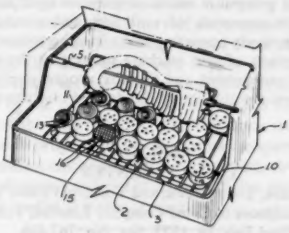
said patty only and away from parts of said patty on either transverse side of said portion.

4,089,261

COOKING GRILL AND BRIQUETTES THEREFOR

Mark M. Hart, 37 Huntleigh Woods, St. Louis, Mo. 63131

Division of Ser. No. 176,088, Aug. 30, 1971. This application Apr. 17, 1973, Ser. No. 351,890
Int. Cl.[2] A47J *27/00*
U.S. Cl. 99—446 6 Claims



1. In a grill for cooking meat, said grill having a heat source, a grizzly above said heat source, and a meat support above said grizzly, the improvement comprising a plurality of solid, liquid impervious aluminum briquettes supported by said grizzly in vertically spaced relation to said meat support and in spaced relation through at least a part of each of their perimeters from one another so as to provide a plurality of heat-communicating channels between said heat source and said meat support, said briquettes having at least one convex surface oriented toward the meat support and liquid retaining means on said convex surface.

4,089,262

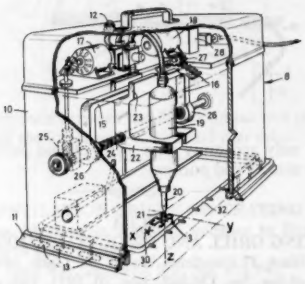
APPARATUS FOR PRINTING DATA ON STRUCTURAL COMPONENTS

Joachim Sopora, Weidenpescher Str. 27, 5 Cologne 60, Germany

Continuation of Ser. No. 575,232, May 7, 1975, abandoned. This application Sep. 3, 1976, Ser. No. 720,362
Claims priority, application Germany, May 14, 1974, 2423424
Int. Cl.[2] G01D *15/02*
U.S. Cl. 101—4 12 Claims

1. A marking machine comprising means for marking a desired character upon a surface of a structural component, said marking means including a marking tip, means for vibrating said marking tip a plurality of times against the surface of the structural component to deform the latter and form the desired character, said marking tip having a contact surface which contacts said structural component surface of a surface area appreciably smaller than the overall surface area of the desired character whereby a multiplicity of contacts of said marking tip surface against the structural component surface are necessary to form the desired character, first moving means

for moving said marking tip along a first path contiguous the structural component surface, second means for moving said marking tip along a second path contiguous the structural component surface and generally normal to said first path, a generally closed portable housing within which is housed said marking means and said first and second marking tip moving means, said housing having an end adapted to be disposed contiguous the surface of the structural component to be



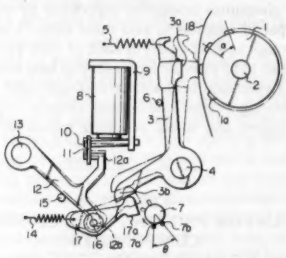
marked, an opening in said housing end, and said marking tip being positioned adjacent said opening whereby to contact the structural component surface therethrough to form the desired character, and computor means responsive to input data for controlling the operation of said first and second moving means and selectively operating said vibrating means to impart sequential contacts of said marking tip against the surface of the structural component and thereby progressively contact-by-contact form the totality of the desired character.

4,089,263

IMPACT PRINTER

Katsuhiko Okabe, Tokorozawa, and Yoshiyuki Sudo, Yono, both of Japan, assignors to Copal Company Limited, Tokyo, Japan

Filed Feb. 10, 1977, Ser. No. 767,618
Claims priority, application Japan, Feb. 12, 1976, 51-15264[U]
Int. Cl.² B41J *9/10, 9/36*
U.S. Cl. 101—93.33 **4 Claims**



1. Impact printing having

a rotating printing drum bearing a plurality of axially extending rows of printing characters circumferentially arranged on the peripheral surface of said drum, the characters in any one row being identical to each other and different from the characters in other rows,

a driving shaft adapted to be driven at a speed in synchronism with said drum,

printing hammers each belonging to the respective character in each row for printing a selected character at the printing position of said printer during the rotation of said drum when said hammer is actuated,

control levers each belonging to the respective printing hammer for actuating the same when driven,

said driving shaft being provided with driving projection means for driving the respective control levers in such a manner that the same are actuated in synchronism with the arrival of the selected row of said drum at said printing position during the rotation of said drum,

said control levers being normally held apart from said driving projection means so as to be inoperative by said driving projection means but, upon manuipulation of said printer for the required printing operation, selected one or ones of said control levers being brought to positions at which they are driven by said projection means thereby permitting required printing operation to be effected,

wherein the improvement comprises:

said driving projection means being divided into at least a first and a second section,

said first and said second sections being slightly shifted angularly around said shaft from each other,

said first section extending along a first axial portion of said shaft,

said second section extending along a second axial portion of said shaft, said section each having a length a least equal to the width of two adjacent rows,

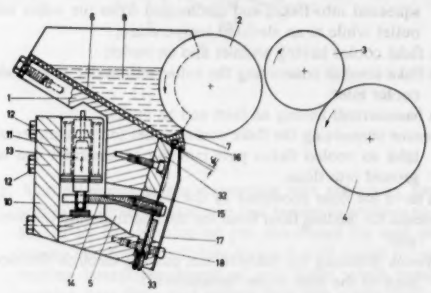
said first and said second portions being free of any other section along the same axial portion thereby avoiding excessive power required for the actuation of said hammers even though the same characters in one row are to be printed simultaneously while the printed characters in each row is substantially held in alignment with each other.

4,089,264

INKING UNIT FOR PRINTING MACHINES

Willi Jeschke, Heidelberg, and Wolfgang Pfizenmaier, Seeheim, Bergstr., both of Germany, assignors to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Germany

Filed Jul. 2, 1976, Ser. No. 702,141
Claims priority, application Germany, Jul. 5, 1975, 2530109
Int. Cl.² B41F *31/04*
U.S. Cl. 101—365 **4 Claims**



1. Inking unit for a printing machine comprising an ink duct, a ductor roller having a surface engageable with ink received in said ink duct, an ink transfer roller for transferring ink from said ductor roller to other rollers, a ductor knife engageable along the length thereof with the surface of said ductor roller and adjustable in position relative to the surface of said ductor roller in zones extending along said length of said ductor knife for controlling the amount of ink to be transferred, and means for adjusting said zones of said ductor knife pulse-like into engagement with and disengagement from the surface of said ductor roller with strokes of equal length and with a stepwise variable stroke time, said adjusting means comprising electromagnetic devices mounted on said ink duct and having armatures, respectively, associated with the zones of said ductor knife, resilient straps respectively secured to said ductor knife at said zones thereof, and means operatively connecting said armatures to said resilient straps, respectively, for flexing the

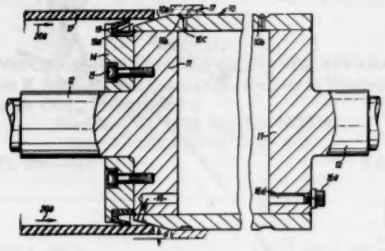
respective straps in a loopwise manner upon energization of the respective electromagnetic device and displacement of the respective armatures.

4,089,265

FLEXOGRAPHIC PRINTING ROLL AND MEANS FOR ASSEMBLING SAME

William Paul White, Ellesmere Port, and Michael William James Lewis, Manchester, both of England, assignors to M. A. Buckley (Engraving) Limited, Woolston, England

Filed Aug. 20, 1976, Ser. No. 716,222
Claims priority, application United Kingdom, Aug. 28, 1975, 35492/75; Dec. 23, 1975, 41814/74
Int. Cl.[2] B41F *27/00*
U.S. Cl. 101—375 6 Claims



1. In a flexographic printing roll comprising a rigid base tube having perforations in the form of a plurality of small apertures and a circumferentially stretchable printing sleeve on said tube strained to grip the tube to retain the sleeve securely on the tube; means on one end of the base tube to aid the sliding of the sleeve on the tube, said means comprising apparatus having aperture defining means extending from the inside of the base tube to a point external of the base tube that is not covered by the sleeve when fitted whereby a localized pneumatically applied circumferential strain can be created in the sleeve progressively by pressure in said aperture defining means acting on the sleeve as the sleeve is slid on the tube.

4,089,266

EXPLOSIVE BARRIER WIRE

Daniel D. Musgrave, 8201 Caraway St., Cabin John, Md. 20731

Continuation-in-part of Ser. No. 676,067, Apr. 12, 1976, Pat. No. 4,015,506. This application Jan. 6, 1977, Ser. No. 757,201
The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.
Int. Cl.[2] F42B *37/00*
U.S. Cl. 102—8 10 Claims

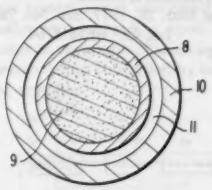
1. An explosive barrier wire comprising: a flexible strand; a strip wrapped around said strand, said strip including portions adapted for deformation outwardly whereby said barrier wire will have a hazardous configuration; and explosive means interposed between said strand and said strip; whereby initiation of said explosive means can deform said portions outwardly.

4,089,267

HIGH FRAGMENTATION MUNITION

John F. Mescall, W. Newton, and Paul V. Riffin, Lexington, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 29, 1976, Ser. No. 727,912
Int. Cl.[2] F42B *13/48, 27/02*
U.S. Cl. 102—67 3 Claims



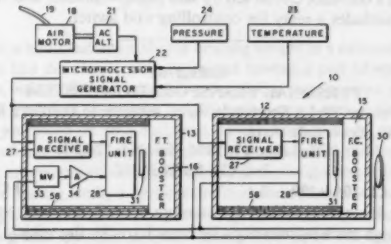
1. A high fragmentation munition consisting of a slapper, a high explosive contained within said slapper, said slapper being positioned within and uniformly spaced from the wall of an outer casing, the thickness of said slapper and the radial distance of the space between the outer wall of the slapper and the inner wall of the outer casing are each equal to one-half the thickness of the outer casing, whereby upon detonation, the high explosive propels the slapper across the space to the outer casing to make a mechanical impact therewith, thereby imparting circumferential and radial stresses to the outer casing resulting in a spallatial mode of fracture.

4,089,268

SAFE ARMING SYSTEM FOR TWO-EXPLOSIVE MUNITIONS

Miles F. Jaroska; William A. Niven, and Jasper J. Morrison, all of Livermore, Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 30, 1977, Ser. No. 782,871
Int. Cl.[2] F42C *15/40*
U.S. Cl. 102—70.2 R 10 Claims



1. A system for safely and positively detonating high-explosive munitions, including:

a source for generating a series of input pulses having predetermined unique characteristics;

an output circuit;

a transformer core with a square-loop hysteresis curve characteristic and saturable in first and second directions;

first and second input windings and an output winding wound on said transformer core, said input windings being connected to said source and said output winding connected to said output circuit;

an input circuit including said input windings responsive solely to pulses having said predetermined unique characteristics for driving said transformer core to saturation alternately in first and second directions to produce a predetermined output of energy in said output circuit; and

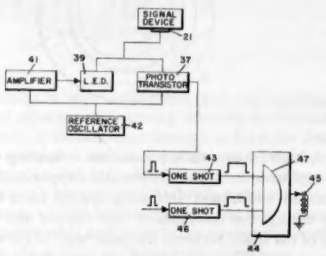
means for selective control of the energy in the output circuit to detonate the munitions.

4,089,269

VEHICLE CONTROL SYSTEM

Raymond J. Shaw, Westboro, Mass., assignor to Mekontrol, Incorporated, Northboro, Mass.

Filed Mar. 28, 1977, Ser. No. 782,236
Int. Cl.[2] B61J *3/04*
U.S. Cl. 104—88 **10 Claims**



1. Vehicle control system for use with a vehicle movable over a floor and carrying a signal device, comprising:

(a) a receptacle adapted to be embedded in the floor,

(b) a cover fixedly mounted on the receptacle and having an aperture,

(c) a sensor including a housing mounted on the undersurface of the cover and lying with the receptacle and including a lens mounted with its axis in line with said aperture and a photo-transistor,

(d) a generator mounted within the sensor housing and including an amplifier and a light-emitting diode connected to said amplifier for producing a modulated light beam from the lens,

(e) a reference oscillator connected to said amplifier and photo-transistor to form a phase-locked loop,

(f) a vehicle switch mechanism, and

(g) a one-shot circuit fed by said photo-transistor and which includes a relay for controlling said switch.

4,089,270

PERSONAL TRANSPORATION SYSTEM

A. Webster Blake, Scottsdale, Ariz., assignor to Dahlberg Industries, Scottsdale, Ariz.

Filed Sep. 17, 1976, Ser. No. 724,388
Int. Cl.[2] E01B *25/12*
U.S. Cl. 104—130 **9 Claims**

1. A steering system for steering a track mounted vehicle through track intersections for branch tracks, the vehicle being directionally guided and laterally supported along each track by vehicle mounted guides bearing against opposed side wall members of the tracks, the improvement comprising in combination;

a. at least one wheel mounted on the vehicle for guiding the vehicle along a path through a track intersection;

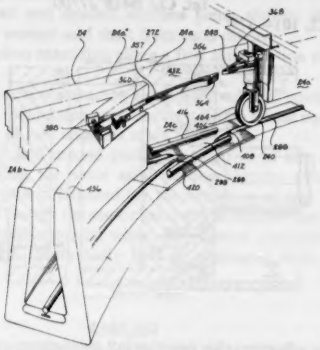
b. a laterally pivotable probe extending forwardly of the vehicle for initiating a direction change of the vehicle at an intersection, said probe including means for reorienting said wheel to a direction change of the vehicle at an intersection;

c. a switching means disposed at an intersection of the tracks and responsive to said probe for directing the vehicle through the intersection; said switching means including:

i. a switching vane having a free end;

ii. spring bias means for urging a central location of said switching vane;

iii. pivot means for accommodating lateral pivotal movement of the free end of said switching vane in either rotational direction from the central location to a vehicle guiding location in response to engagement of said switching vane by said probe; and



iv. guide means disposed upon said switching vane and cooperating with the vehicle mounted guides for guiding and laterally supporting one side of the vehicle upon engagement of the probe and switching vane and as the vehicle travels through the intersection;

d. control means for pivoting said probe laterally to engage one or another side of said switching vane and, in response to forward movement of the vehicle, forcing said switching vane to pivot laterally to engage said guide means with the vehicle mounted guides;

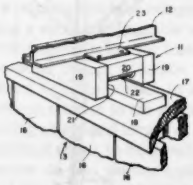
whereby, during forward motion of the vehicle into an intersection and during engagement with one of the sides of said switching vane, the free end of said switching vane is laterally pivoted to guide and support the vehicle along a selected path through the intersection.

4,089,271

LOAD SUPPORTING AND MOVING PORTABLE ROLLER SKID

Charles L. Pack, 641 Glenco, St. Charles, Mo. 63301

Filed Dec. 16, 1976, Ser. No. 751,019
Int. Cl.[2] B65G *7/04*
U.S. Cl. 104—134 **1 Claim**



1. Load supporting and moving means comprising: fixed means forming load directing run-ways; load supporting and guiding means carried by said run-ways, said last means having a longitudinal rollway surface presented to the load to be moved and opposed side margins; roller skid means mounted

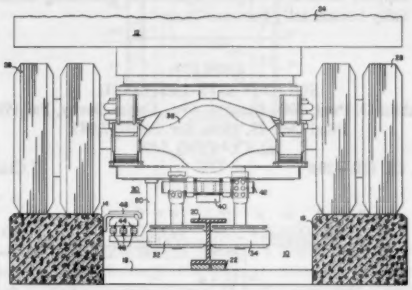
on said rollway surface in position to present a load engaging surface to the load to be moved, each roller skid means including a pair of side members spaced apart and disposed at the opposite side margins of said load supporting and guiding means, bearings mounted in each of said side members in opposed facing alignment, rollers engaged in said bearings and extending in parallel relation between said side members, said side members presenting load bearing surfaces to the load to be moved, and separately formed means spaced from said rollers and engaged with and between said side members adjacent said load bearing surfaces of said side members to retain them in spaced apart relation; and clamping means carried by the skid means in position to secure the load on said load bearing surfaces opposite said rollers so as to locate said roller skid means in position to support and move the load, said clamping means including a fixed member and a cooperating adjustable member for clamping the load against said fixed member.

4,089,272

TRANSPORTATION VEHICLE GUIDANCE APPARATUS

William E. Schmitz, Wilkinsburg, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 22, 1976, Ser. No. 743,829
Int. Cl.[2] B61B *13/04;* B61F *9/00*
U.S. Cl. 104—247 **5 Claims**



1. In a guidance apparatus for a mass transit vehicle having support wheels operative with a roadway including spaced tracks and a vehicle restraining guide beam, said vehicle having guide wheels operative with said guide beam, the combination of:

vehicle coupling first means coupled with said support wheels and the body of said vehicle,

vehicle steering second means coupled with said guide wheels for steering said vehicle along said roadway,

with one of said first and second means being positioned within the other of said first and second means to provide a safety lock-on of the vehicle in relation to said guide beam, and

means including a spring member positioned between said first means and said second means for coupling between said vehicle coupling first means and said vehicle steering second means to isolate the forces provided by said guide beam when the vehicle moves along said roadway.

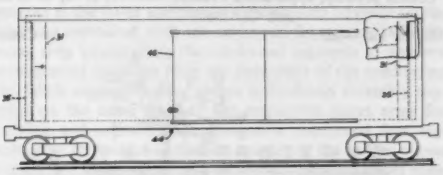
4,089,273

ADJUSTABLE FLUID ACTUATED BULKHEAD

Sergei G. Guins, 4496 Dobie Rd., Okemos, Mich. 48864

Filed Jun. 9, 1975, Ser. No. 585,050
Int. Cl.[2] B60P *7/14, 7/16;* B61D *3/00, 45/00*
U.S. Cl. 105—376 **40 Claims**

1. An adjustable bulkhead of the type having at least one structural frame member, and at least one movable bulkhead panel operatively connected thereto by a clevis linkage system and including at least one stallable air-operated hydraulic actuating means supplied by an air supply of a predetermined fixed volume and adapted to operate said clevis linkage system in such a manner as to expand said panel until said actuating means stalls whenever said means is activated initially upon the placing of lading in a vehicle, and subsequently upon shifting of lading until said hydraulic actuating means stalls, said fixed volume air supply effecting a decreased pressure being applied to said hydraulic actuating means as the mechanical advantage



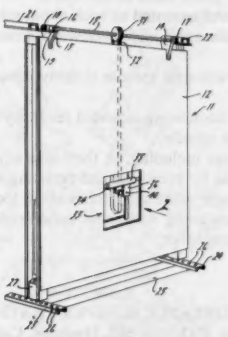
of said clevis linkage system comes into effect, thereby maintaining a substantially constant loading upon said lading, regardless of the amount of expansion of said movable bulkhead panel, with said pressure being controlled by said air supply of predetermined fixed volume.

4,089,274

BULKHEAD OPERATING MECHANISM

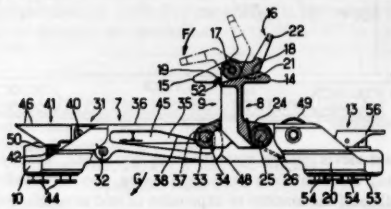
Thomas G. Stone, Hinsdale, Ill., assignor to Evans Products Company, Portland, Oreg.

Filed Sep. 17, 1976, Ser. No. 724,400
Int. Cl.[2] B60P *7/14*
U.S. Cl. 105—376 **4 Claims**



1. In a bulkhead assembly for bracing freight in a railroad car or the like defining a cargo area and having a pair of spaced tracks, said bulkhead assembly comprising panel means presenting a surface to engage freight in the cargo area, a timing shaft journaled on said bulkhead panel means, wheels on the ends of said timing shaft adapted to contact said tracks and effect movement of said panel means therealong upon rotation of said timing shaft, a sprocket affixed for rotation with said timing shaft, and an endless chain looped over said sprocket for rotating said sprocket and said timing shaft upon the application of a pulling force to said chain, the improvement comprising lever means pivotally supported on said bulkhead panel means, a notch in a portion of said lever means adapted to receive a link of said chain for affording a detachable connection to said chain for applying a pulling force to said chain when connected thereto and means to preclude inadvertent entry of the chain links into said lever means notch comprising a latch movable between a blocking position and a released position.

4,089,275
PALLET LOCK
Robert Pelletier, Le Perreux, France, assignor to Societe d'Exploitation des Etablissements H. Pelletier, Aubervilliers, France
Filed Nov. 15, 1976, Ser. No. 741,677
Claims priority, application France, Nov. 17, 1975, 75 35020
Int. Cl.[2] B60P 7/08
U.S. Cl. 105—465 14 Claims



10. A lock for stowage of freight in a vehicle, such as the stowage of containers or pallets in the bay of an aircraft, comprising:

two supporting spars,

first and second latches arranged transversely between said spars and hinged pivotally about a common transverse axis, so that they can be pivoted between a locked position and an unlocked position, each said latch having a flange for anchorage of the freight,

a locking handle mounted to pivot about said transverse axis between said latches,

a fixed transverse spindle carried by the spars, said first latch being mounted pivotally about said spindle,

a transverse pivot fixed to the spars,

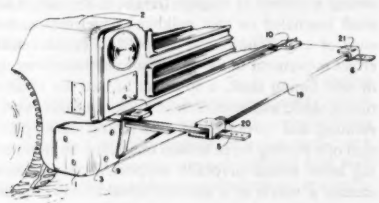
a locking lever mounted to rock about said spars, said lever having side arms with slideways arranged inside them, and

a slidable transverse spindle slidably mounted in said slideways,

said second latch being mounted pivotally about said slidable transverse spindle,

said slideways including, at their end adjacent the latches, stop means for receiving and retaining said slidable transverse spindle when the latches are in locked position, said stop means being actuatable upon rocking movement of said locking lever.

4,089,276
PORTABLE BUMPER PLATFORM
Ernest S. Enos, P.O. Box 547, Hughson, Calif. 95326
Filed Apr. 8, 1977, Ser. No. 785,737
Int. Cl.[2] A47B 23/00
U.S. Cl. 108—44 2 Claims

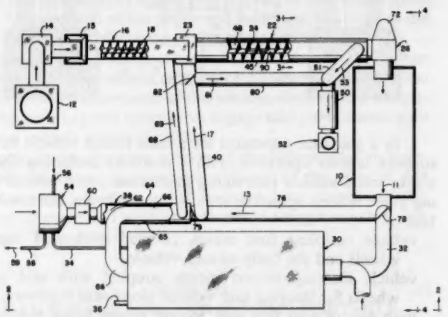


1. A portable bumper platform for supporting a mechanic on the bumper of a truck, bus, or the like, to facilitate work on the engine thereof, the truck, bus, or the like, having a bumper with a main part extending substantially vertically and an upper lip extending inward toward the truck, bus, or the like, substantially horizontally, from the top edge of the main part of the bumper, said portable bumper platform comprising

a pair of elongated plank-type support members having spaced opposite first and second ends, the first end of each of the support members being bent over on itself to form a substantially flat U to accommodate the upper lip of the bumper of the vehicle; and

a pair of braces for releasably maintaining the support members in substantially horizontal position extending beyond the bumper of the vehicle, each of said braces comprising a main plank-type part having spaced opposite first and second ends and being folded substantially perpendicularly to itself at the first end thereof, said main part having a slot formed therethrough substantially parallel to the folded part thereof and spaced in proximity therewith for accommodating a support member, a support part extending substantially perpendicularly from the main part next-adjacent the slot and closer to the second end than said slot and bracing means extending from the second end of the main part to the free end of the support part whereby in position the main part of each of the braces abuts the main part of the bumper with the support part of each of the braces extending away from the bumper and supporting a corresponding one of the support members hooked at its first end to the upper lip of the bumper whereby said support members support a platform extending substantially horizontally between them.

4,089,277
SOLID WASTE DISPOSAL
Franklin O. Paul, 7006 Penarth Ave., Upper Darby, Pa. 19082
Filed Oct. 29, 1976, Ser. No. 737,087
Int. Cl.[2] F23G 5/04
U.S. Cl. 110—204 7 Claims



1. A solid waste disposal apparatus for incinerating solid wastes, which comprises:

(A) a dryer including

a drying chamber for drying the solid waste, a conveyor positioned within said drying chamber to transport the wastes through the dryer, and means to pass heated air through the dryer said means including an inner chamber within which is positioned the conveyor and an outer shell at least partically surrounding the inner chamber;

(B) an incinerator for burning the wastes including means to receive the solid wastes from the dryer, a combustion chamber for incinerating the wastes and wherein hot flue gases are generated, and

flue gas outlet means for leading the hot flue gases from the incinerator;

(C) a boiler receiving at least some of the flue gases from the incinerator, said boiler including a heat exchange means to utilize the heat of the hot flue gases, the heat exchange means exhausting the used hot flue gases from the boiler;

(D) first conduit means adapted to direct hot flue gases from the incinerator or used flue gases from the boiler to the dryer for waste drying purposes, said conduit means being adapted to direct the hot flue gases through the said outer shell;

(E) a heater surrounding at least a part of the first conduit means and adapted to heat ambient air by utilizing heat from the flue gases, and

(F) second conduit means adapted to direct the heated ambient air to the dryer.

4,089,278

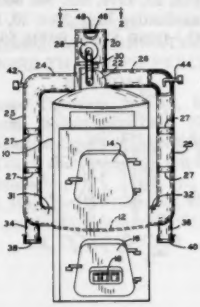
FURNACE, ESPECIALLY A COAL BURNING FURNACE, AND METHOD OF OPERATION

Cecil R. Brandt, R.R. #1, Pleasant Lake, Ind. 46779

Continuation-in-part of Ser. No. 644,328, Dec. 24, 1975, abandoned. This application Jun. 22, 1977, Ser. No. 809,059

Int. Cl.[2] F23J *5/02;* **F22B** *9/08*

U.S. Cl. 110—206 **17 Claims**



1. In a combustion system furnace; a combustion chamber having a grate at the bottom to support material to be burned, a stack in fluid communication with said combustion chamber, fan means connected to the stack and operable for withdrawing gases therefrom, conduit means for fluid communication between the discharge side of said fan means and said combustion chamber above said grate, first means comprising a fixed orifice in said stack for restricting flow of ambient air into said stack to be predetermined limited flow, second means for admitting flow of ambient air in unrestricted quantities into the combustion chamber below said grate.

4,089,279

APPARATUS FOR THE MANUFACTURE OF REINFORCED PANTIES

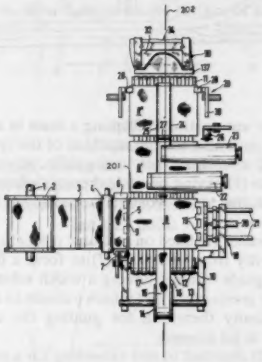
Otto Hess, Heilbronn-Klingenberg; Heinz Dokter, Nordheim, and Werner Scherzinger, Bisingen, all of Germany, assignors to Firma Mayer & Cie., GmbH. & Co., Tailfingen, Germany

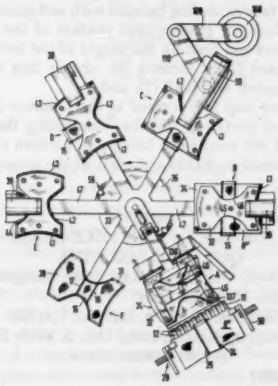
Filed Feb. 10, 1977, Ser. No. 767,493

Int. Cl.[2] D05B *21/00*

U.S. Cl. 112—121.12 **13 Claims**

1. In an apparatus for the automatic manufacture of a reinforced, peripherally contoured fabric blank adapted to be folded over and sewn to form a finished panty, a fixed substantially cylindrical support, a turret rotatably mounted coaxial with the fixed support, plurality of work stations disposed in circumferentially spaced relation around the turret, a plurality of turret arms individually extending radially from the turret at circumferentially spaced positions therealong, means for cyclically indexing the turret to individually position the outer ends of the respective turret arms in registration with the respective work stations, a movable conveyor having an output end terminating at a first one of the work stations, means for loading, onto the input end of the conveyor, a spaced succession of first blank-forming fabric segments each having a peripheral surface larger than the periphery of the contoured blank to be manufactured, means for advancing a reinforcing strip onto the conveyor below and in contact with the lower surfaces of the first segments so that the reinforcing strip is advanced on the conveyor with the first segments, means associated with the conveyor for sewing the edges of the reinforcing strip to the overlying portions of the first segments to reinforce the first segments as the latter and the reinforcing strip advance on the conveyor, associated with the conveyor for cutting the reinforcing strip intermediate the reinforced segments to separate the reinforced segments from the remainder of the reinforcing strip, fabric segment holder means individually rotatably supported on the outer ends of the respective turret arms for receiving and capturing the successive reinforced first segments from the output end of the conveyor, the holder means having a first lower plate and a second cooperating upper plate





for selectively capturing the received first segment therebetween, the first and second plates having contoured peripheries corresponding to the contour of the blank to be manufactured whereby an outer area of the captured first segment projects beyond the peripheral surface of the first and second plates, means carried by the turret for rotating each holder means within the associated arm over a prescribed angle as the turret is indexed into prescribed successive second ones of the work stations following the first work station to expose different portions of the holder means periphery to the successive second work stations, and contour sewing machine means operatively disposed at each of the successive ones of the second work stations and cooperable with the then-exposed portion of the holder means periphery for cutting away the associated region of the projecting outer area of the captured first segement and for forming edge seams on said first segment along

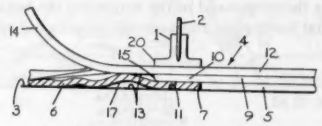
the periphery of the then-exposed portion of the holder means periphery.

4,089,280

SEWING MACHINE WORK GUIDE FOR AUTOMATICALLY FORMING A SEAM ALONG A CURVED PATH

Nerino Marforio, Milan, Italy, assignor to Rockwell-Rimoldi, S.p.A., Milan, Italy

Filed Aug. 2, 1976, Ser. No. 710,553
Claims priority, application Italy, Sep. 11, 1975, 27121/75
Int. Cl.[2] D05B *35/10*
U.S. Cl. 112—153 **2 Claims**



1. A guide for automatically forming a seam in a workpiece along a curved path on a sewing machine of the type having a presser foot and a work surface, said guide comprising:

(a) a base plate (**5**) having one side thereof defining a vertical wall (**7**) attached to the work surface at an angle oblique to the sewing axis;

(b) a plate member (**9**) fixed on said base plate (**5**) and extending outwardly from said wall (**7**) to form a first part (**11**) defining a guide channel having a width substantially the same as the presser foot and which extends to a position of close proximity therewith for guiding the edge of the workpiece to be seamed;

(c) a plate (**12**) attached to and extending for a portion of its length horizontally outward from said plate member (**9**) to form a second part (**13**) of the guide channel having a planar surface extending parallel with and spaced from the work surface for guiding that portion of the workpiece that puckers and limiting the height of the latter to effect a downward force thereon for urging that edge to be seamed against said wall (**7**); and

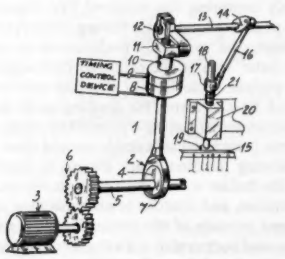
(d) a rounded step (**15**) formed at the juncture of said first and second parts (**11, 13**) for maintaining the puckered portion of the workpiece being sewn within the confines of said second part (**13**) and clear of the presser foot.

4,089,281

CONTROL DEVICE OF A NEEDLE-BEARING IN A QUILTING MACHINE

Giannino Landoni, Fagnano Olona, Italy, assignor to Meca S.n.c., Cassano Magnago, Italy

Filed Sep. 27, 1976, Ser. No. 726,758
Claims priority, application Italy, Oct. 3, 1975, 27932 A/75
Int. Cl.[2] D05B *55/14*
U.S. Cl. 112—221 **1 Claim**



1. In an apparatus which includes reciprocating means connected to at least one needle-bearing bar of a quilting machine for driving the needle-bearing bar, the improvement comprising

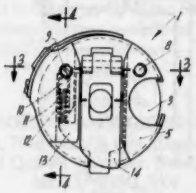
a control device having means for disengaging said reciprocating means from said needle-bearing bar, said means comprising a reciprocable rod, a first electromagnet fastened to said reciprocable rod, a second electromagnet slidably mounted on said reciprocable rod, whereby the needle-bearing bar is engaged with the reciprocating means whenever the electromagnets are energized and disengaged when they are not energized, and an electronic timing means for automatically controlling subsequent energizations and de-energizations of said electromagnets.

4,089,282

BOBBIN CASE

Alberto Cerliani, Pavia, Italy, assignor to Construzioni Meccaniche Cerliani S.p.A., Pavia, Italy

Filed Feb. 23, 1976, Ser. No. 660,376
Claims priority, application Italy, Nov. 20, 1975, 29490 A/75
Int. Cl.[2] D05B *57/14*; B65H *59/04*
U.S. Cl. 112—229 **7 Claims**



1. A bobbin case for double knotted-stitch sewing machines, comprising a bobbin case latch, a thin plate spring for braking the bobbin, the pressure of which spring is adjustable by means of an adjusting screw operating in a threaded hole provided in the said bobbin case and extending in a direction perpendicular to said braking spring, wherein a means is provided for exerting a thrust on the adjusting screw and allowing an even, constant loading of the latter, the said thrust means comprising a pressure element resiliently urged in a direction at a right angle to the longitudinal axis of the adjusting screw, the said pressure element comprising a plunger urged by a thrust spring and sliding within a guide hole communicating with the threaded hole of the adjusting screw, the said thrust spring also serving as a return spring for the bobbin case latch.

4,089,283

METALLIC CONTAINER AND METHOD FOR MAKING THE SAME

Marc Frans Mertens, Landskouter, and Bernard Wantiez, Mariakerke, both of Belgium, assignors to Rheem Manufacturing Company, New York, N.Y.

Filed Mar. 23, 1977, Ser. No. 780,680
Claims priority, application Belgium, Jun. 21, 1976, 255122; Jan. 11, 1977, 255580
Int. Cl.[2] B21D *51/30*
U.S. Cl. 113—120 K **5 Claims**

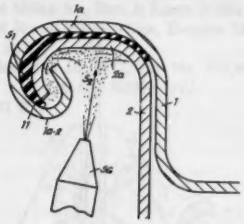
1. The method of joining a cover to a drum to form a sealed container comprising the steps of:

(a) applying a first quantity of sealing material in first flowability state to a flange of said cover;

(b) after said first quantity of sealing material exhibits a preselected second flowability state decreased from said first flowability state thereof, placing a flange of said drum in facing relation with said first quantity of sealing material; and then

(c) introducing a second quantity of said sealing material in

said first flowability state contiguous with such first quantity sealing material between said cover flange and said



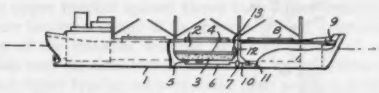
drum flange while jointly winding said drum and cover flanges.

4,089,284

SLURRY VESSEL WITH DEWATERING PORTS COVERING MORE THAN TWO PERCENT OF HOLD BOTTOM

Yoshiyuki Matsuno; Tomiyasu Nohara, both of Nagasaki; Fumiaki Komatsu, Nishinomiya, and Nobuyuji Imanishi, Kobe, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo and Kabushibi Kaisha Kobe Seikosho, Kobe, both of Japan

Filed May 22, 1975, Ser. No. 580,471
Claims priority, application Japan, May 23, 1974, 49-58078
Int. Cl.[2] B63B *35/28*
U.S. Cl. 114—26 **1 Claim**



1. A process for controlling the degree of consolidation of a cargo of slurry being transported in a hold of a water-borne vessel, comprising:

sucking liquid from the slurry by means of vacuum through a plurality of openings at the bottom of the hold, the total area of said openings exceeding 2 percent of the bottom area of the hold, so that a layer of said slurry becomes unsaturated by partly replacing water within the slurry layer by air, whereby contact pressure between slurry particles is increased, displacement and rearrangement of the particles become difficult, and thus consolidation of the slurry is prevented.

4,089,285

SECONDARY BARRIER CONSTRUCTION FOR VESSELS CARRYING SPHERICAL LOW TEMPERATURE LIQUIFIED GAS STORAGE TANKS

Tomiyasu Okamoto; Tsunanori Nishimoto; Kaoru Sawada; Koji Hayakawa, and Tomomichi Kurihara, all of Osaka, Japan, assignors to Hitachi Shipbuilding & Engineering Co., Ltd., Osaka, Japan

Filed Sep. 22, 1976, Ser. No. 725,462
Int. Cl.[2] B63B *3/68, 25/16*
U.S. Cl. 114—74 A **4 Claims**

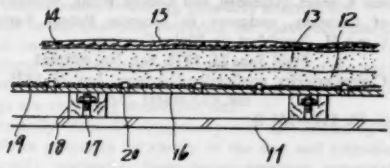
1. A secondary barrier construction for the hold plate of a vessel carrying a spherical low temperature liquified gas storage tank, comprising

joists mounted on said hold plate;

a plywood sheet having a back surface and a front surface;

means fixing said plywood sheet to said joists whereby an air space is defined between said back surface and the hold plate;

a wire net fixed to said front surface of said plywood sheet;



a plurality of rigid foam synthetic resin layers spray-formed on said front surface of said plywood sheet and

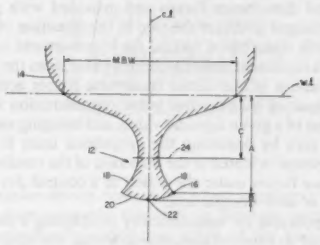
a protective layer formed on the surface of said resin layers.

4,089,286

SAILBOAT KEEL

Henry A. Scheel, Rockport, Me., assignor to Jeanne Greaves Hall Sheel, Rockport, Me.

Filed Mar. 4, 1976, Ser. No. 663,840
Int. Cl.[2] B63B *3/38*
U.S. Cl. 114—140 **11 Claims**



1. A keel structure for a sailboat lying below and affixed to the bottom of the canoe hull thereof, the structure extending downwardly a predetermined distance below the hull load waterline, being disposed between the forward and after ends of said waterline, terminating in a bottom surface convexly curved symmetrically about the longitudinal vertical center plane of the structure, having a minimum transverse width located in a first horizontal plane whose depth below said waterline is equal to 0.110 ± 0.040 times the length of said waterline and a maximum transverse width located in a second horizontal plane above said bottom surface whose depth from said waterline is equal to 0.152 ± 0.038 times the length of said waterline and whose vertical distance above the centerline of said bottom surface is equal to 0.01 ± 0.002 times said second named depth,

the transverse width of the structure increasing in concave curvilinear fashion from said minimum width downwardly and outwardly to said maximum width,

each pair of opposed curves of intersection with said structure of any horizontal plane, from the plane of minimum transverse width to the plane of maximum width, being oppositely convex, symmetrical and curving toward each other from opposed points of maximum extension from said longitudinal vertical center plane to points of mutual intersection at the forward and after ends of the structure, respectively,

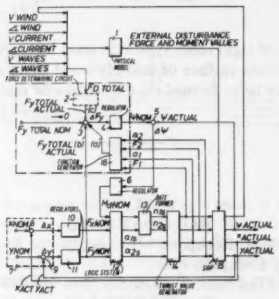
whereby said structure presents smooth concave boundaries extending both forward and aft of its maximum width.

4,089,287

METHOD AND APPARATUS FOR THE AUTOMATIC POSITIONING OF A SHIP TO MINIMIZE THE INFLUENCE OF EXTERNAL DISTURBANCE FORCES

Klaus Kranert, Hamburg, and Konrad Wilke, Wiesenweg, both of Germany, assignors to Licentia Patent Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Jun. 24, 1976, Ser. No. 699,651
Claims priority, application Germany, Jun. 24, 1975, 2528073
Int. Cl.² B63H 25/42
U.S. Cl. 114—144 B 7 Claims



1. In a method for automatically positioning a ship subjected to external disturbance forces and provided with propulsion means arranged to orient the ship in the direction of the resultant of such disturbance forces, the improvement comprising: deriving a representation of a control value from the sum of the representations of the actual transverse forces acting on the ship; comparing such control value representation with a representation of a given nominal value; and bringing such control value to zero by operating the propulsion units to cause the ship to become oriented in the direction of the resultant of such disturbance forces under the action of a control device and on the basis of such comparison.

6. In apparatus for automatically positioning a ship while it is subjected to external disturbance forces, the ship being provided with two longitudinally separated propulsion units arranged to orient the ship in the direction of the resultant of such disturbance forces, the improvement comprising: means for deriving a representation of a control value from the sum of representations of the actual transverse forces acting on the ship; comparator means connected to receive such representation with a representation of a given nominal value; a control device connected for reducing such control value to zero; and means connected for controlling the longitudinal thrust produced by said propulsion units in a manner to establish a positive ratio of variable magnitude between the longitudinal thrust levels produced by said two units, and including control means for increasing the ratio until the maximum thrust capacity of that one of said units which is closer to the stern of the ship has been reached.

4,089,288

ANCHOR WITH STABILIZATION MEMBERS

Rob van den Haak, Allegro 114, Krimpen an der Ijssel, Netherlands

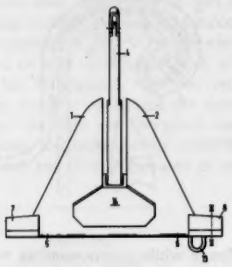
Filed Oct. 5, 1976, Ser. No. 729,656
Int. Cl.² B63B 21/44
U.S. Cl. 114—309 3 Claims

1. An anchor comprising:

fluke means comprised of two flukes having side corners at the rear of each fluke and defining fluke surface area;

a shank pivotally mounted to said fluke means substantially coincident to the geometric center of said fluke surface area; and

a stabilizer member mounted at the rear end of each fluke of said fluke means and extending outwardly from said fluke from a point inside said fluke, said stabilizer members being mounted to said fluke behind the point at which said



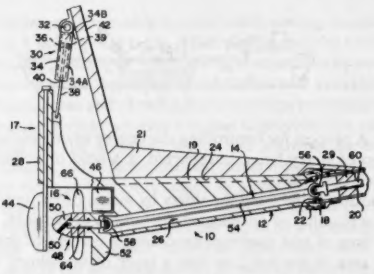
shaft is pivotally mounted to said fluke means, said stabilizer member having leading faces at an acute angle to said flukes.

4,089,289

MOVABLE BOAT PROPULSION APPARATUS

Kenneth D. Sauder, 1861 Brentwood Dr., Clearwater, Fla. 33516

Filed Oct. 27, 1976, Ser. No. 736,116
Int. Cl.² B63H 5/12
U.S. Cl. 115—41 HT 10 Claims

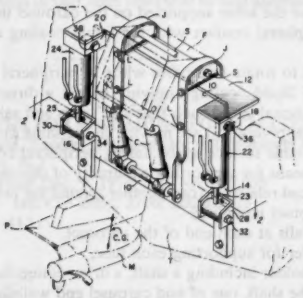


1. A boat propulsion drive system, for use primarily in combination with a boat power means and a boat, having a transom, said boat propulsion drive system comprising: a drive assembly housing pivotally attached to the boat hull; and drive assembly means operatively mounted to said drive assembly housing, said drive assembly housing including strut means to interconnect the rear portion of said drive assembly housing to said boat hull, propeller means mounted on said drive assembly housing, said drive assembly means including flexible coupling means to interconnect said drive assembly means to said propeller means and the boat power means, said drive assembly housing being movable relative to said boat hull, whereby said drive assembly means drives said propeller means at a substantially constant torque, said strut control mear s comprising an enclosed cylinder having a piston disposed therein, said piston disposed in said enclosed cylinder; said cylinder having a first and a second cylinder portion, aperture means interconnecting said first and second portions of said enclosed cylinder; said cylinder containing a fluid to control rate of movement of said piston relative to said cylinder in accordance with the fluid flow through said aperture means, and said cylinder and piston being mounted between said rear portion of said drive assembly and the transom of the boat.

4,089,290
ADJUSTABLE HEIGHT OUTBOARD MOTOR MOUNTING

Denny Herschel Miles, Sr., Rte. 3; Larry Willis Miles, Sr., 400 Plum St., and Jewell Willis Miles, Douglas Hwy., all of Hazlehurst, Ga. 31539

Filed May 10, 1977, Ser. No. 795,586
Int. Cl.[2] B63H 5/12
U.S. Cl. 115—41 R 4 Claims



1. An adjustable height outboard motor mounting to be secured to the transom of a boat and support the mounting brackets of the motor, comprising:

a. a plate overlying the outer surface of the transom and having means cooperating with the motor mounting brackets and securing them to the plate;

b. upright guide means fixed to the transom parallel to the side edges of the plate and having channels receiving said edges to guide vertical sliding of the plate;

c. a lower bracket fixed to each guide means near its bottom;

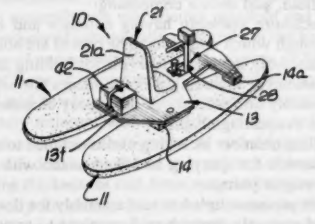
d. an upper bracket spaced above each lower bracket, said plate having a flange at its upper edge and overlying the top of the transom, and the flange extending aft of the plate near the sides thereof above said lower brackets, and each upper bracket secured to the plate and to a portion of the flange extending aft thereof; and

e. power operated hydraulic ram means including a piston and cylinder means mounted between each upper and lower bracket, each piston and cylinder means being located in a plane passing between the plate and the motor, whereby the weight of the motor is aft of the piston and cylinder means and the drag of the plate against the transom due to friction and motor thrust is forward of the piston and cylinder means.

4,089,291
WATERCRAFT

Robert W. Craig, 6343 E. Via Estrada, Anaheim Hills, Calif. 92807

Filed Mar. 28, 1977, Ser. No. 782,249
Int. Cl.[2] B63B 35/72
U.S. Cl. 115—70 10 Claims



1. In a watercraft, the combination comprising

a. two generally longitudinally and horizontally forwardly elongated floats which are laterally spaced apart, the floats having shallow draft,

b. a horizontal platform overlying the floats and spaced thereabove, the platform removably attached to the floats, the platform also extending generally horizontally,

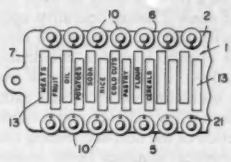
c. a seat on the platform overlying the space between the floats and having an upright back facing forwardly, the platform being cut away generally forwardly of the seat to provide leg spaces through which upper portions of the floats are vertically accessible, and

d. a generally vertically elongated power unit carried by the platform generally forwardly of the seat and extending generally vertically, there being structure removably attached to the platform forwardly of the seat and carrying the unit, the unit including a manual control forwardly of the seat above the platform and a propulsion means located below the level of the floats and generally vertically below said control and platform, said control being manually manipulable to rotate the propulsion means about a vertical axis defined by the unit.

4,089,292
MECHANICAL SHOPPERS GUIDE

Amaury Antonio Laboy, 4145 Wilder Ave., Bronx, N.Y. 10466

Filed Jul. 26, 1976, Ser. No. 708,684
Int. Cl.[2] G09F 9/00
U.S. Cl. 116—133 1 Claim



1. A reminder device comprising a base member, a plurality of spaced discs rotatably mounted on the base member and spaced longitudinally along two edges of the base member with a minor portion of each disc extending beyond the edge of said base member, a plurality of indicia on the surface of the base member spaced longitudinally along the base member and with each being aligned transversely with one of said discs, the indicia on the surface of the base member being a label designating an item obtainable at a store, said discs being provided with positive and negative indication symbols which are movable into alignment with the label to denote whether the item is needed or has already been obtained and which lie on surfaces of said discs which are completely exposed to view, a groove and projection being provided on the discs and base member for interengagement to provide a predetermined position of the discs relative to the associated indicia upon rotating movement of said discs to thereby indicate one of said positive and negative condition relating to such indicia.

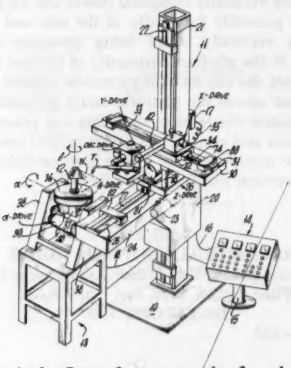
4,089,293
MULTIPLE-COORDINATE MEANS FOR APPLYING A METAL COATING TO A METAL SUBSTRATE

John E. Lyons, Lewittown, N.Y., assignor to Eutectic Corporation, Flushing, N.Y.

Filed Oct. 29, 1976, Ser. No. 736,840
Int. Cl.[2] B05B 12/02
U.S. Cl. 118—7 23 Claims

1. An automatic machine for applying a metal coating along a predetermined path on a surface of a metal substrate, comprising work-holding means, a gas torch for operational discharge upon a local region of work supported by said work-holding means, mounting means for said torch, a frame including guide means for guided movement of said torch via said

mounting means along said path, propulsion means for driving said mounting means along said guide means, said mounting means including drive means for generating an oscillating mechanical displacement of the discharge end of said torch in a limited oscillating sweep generally transverse to the path of movement established by said guide means; said torch comprising a discharge nozzle and means including a gas-flow valve for on-off supply of a gas flow to said nozzle, spray-powder supply means and means including a powder-flow valve for



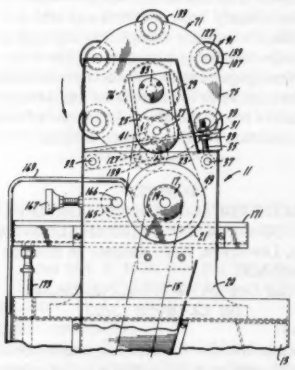
on-off control of a flow of spray powder for admixture with torch flow; and control means operative upon said valves and synchronized with said oscillating-drive means and determining a repetitive cyclical sequence comprising (a) a period of powder-flow valve-open condition for at least the substantial fraction of one oscillating sweep of said path, followed (b) by a period of powder-flow valve-closed condition for at least the substantial fraction of the next-succeeding oscillating sweep of said path, said cyclical sequence being operative only during a continuously open condition of said gas valve.

4,089,294

TUBE COATING APPARATUS

Thaddeus W. Lasiewicz, Park Ridge; Otto Wrabl, Buffalo Grove, and Donald J. Oddo, Rolling Meadows, all of Ill., assignors to Fox Valley Corporation, Appleton, Wis.

Filed Apr. 8, 1976, Ser. No. 675,221
Int. Cl.[2] B05C *1/02, 13/02*
U.S. Cl. 118—230 **11 Claims**



1. An apparatus for applying a finish coating to the cylindrical exterior surfaces of thin-walled tubes, said apparatus including:

a carousel having means for supporting a plurality of thin-walled tubes in spaced relation to one another around the periphery of the carousel,

said carousel being rotatable about a horizontal axis,

a rotatable liquid coating applying roll located adjacent the carousel,

means to rotate said liquid coating applying roll at a selected speed,

means to apply a measured amount of a liquid coating to said liquid coating applying roll,

means to rotate said carousel about said horizontal axis to move the tubes supported on the carousel into and out of peripheral contact with the liquid coating applying roll, and

means to rotate said tubes while in peripheral contact with said liquid coating applying roll in a direction and at a rotational speed such that said tubes and said liquid coating applying roll are moving in the same direction and at the same surface speed during peripheral contact,

said means for supporting a plurality of thin-walled tubes in spaced relation to one another around the periphery of the carousel including:

end walls at each end of the carousel,

a holder for supporting each tube,

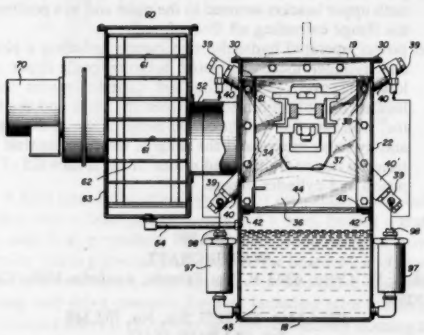
each holder including a shaft, a drive connection at one end of the shaft, one of said carousel end walls having spaced grooves to receive the shafts of said tube holders, releasable locking means to retain the shafts in the grooves, the other of said carousel end walls having means engaging said shaft drive connection and said means to rotate said tubes.

4,089,295

SPRAY COATER DEVICE

Ronald E. Thomson, Cambridge, and James F. Schmitt, Marshall, both of Wis., assignors to Madison-Kipp Corporation, Madison, Wis.

Filed Feb. 2, 1976, Ser. No. 654,216
Int. Cl.[2] B05C *11/16*
U.S. Cl. 118—316 **7 Claims**



1. A spray coating device for coating parts of a conveyor with a fluid, said device comprising:

an enclosure assembly having entrance and exit openings through which said parts to be coated are adapted to pass;

said assembly having a reservoir for holding said fluid,

said assembly including a baffle means for separating said assembly into at least one fluid spray chamber and at least one evacuating chamber;

said fluid chamber including means coupled to said assembly reservoir for spraying said fluid mixed with air onto said conveyor parts;

blower means coupled to said assembly for drawing air into said assembly through said openings to prevent said fluid mixed with air from passing from said enclosure assembly through said openings and for exhausting said air,

filter means including an electrostatic precipitator coupled in series with said blower means and said evacuating chamber for removing excess fluid remaining in said air before said air is exhausted by said blower means;

said filter means including a reservoir for collecting excess fluid removed from said air by said electrostatic precipitator; and

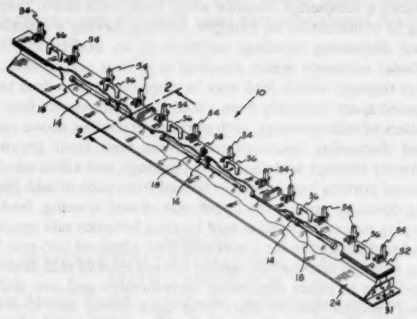
means including a conduit connecting said filter reservoir and said assembly reservoir for draining said excess fluid accumulated in said filter reservoir to said assembly reservoir.

4,089,296

APPARATUS FOR SPREADING FOAM MATERIAL

Henry J. Barchi, Yardley, Pa., assignor to Congoleum Corporation, Kearny, N.J.

Filed Dec. 9, 1975, Ser. No. 639,035
Int. Cl.[2] B05C *3/00*; B32B *5/18*
U.S. Cl. 118—413 **5 Claims**



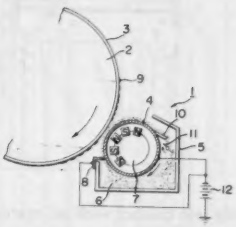
1. Coating apparatus for spreading foam material substantially uniformly in thickness and relatively free of undesirable air bubbles, blisters, or blotches, in the form of large or irregular spots or blemishes, across the full width of continuously advancing sheet material comprising: a coating manifold for receiving foam material having a predetermined density and under a pressure of less than about 5 pounds per square inch gauge; a top plate clamped in air-tight fashion to the top of said coating manifold to prevent air from entering said coating manifold during use of the same; means to substantially completely fill said coating manifold with said foam material at said predetermined density and under said pressure; means to maintain the predetermined density of said foam material in said coating manifold substantially constant from point of entry thereto to point of exit therefrom; means comprising a pair of sloping or slanting walls which gradually and uniformly converge to form a nozzle having a relatively long, narrow slit, one of said pair of sloping or slanting walls being disposed at an angle of from about 4° to about 16° to the direction of movement of said continuously advancing sheet material for delivering said foam material from said coating manifold and spreading said foam material substantially uniformly in thickness and relatively free of undesirable air bubbles, blisters, or blotches, in the form of large or irregular spots or blemishes, across the full width of said continuously advancing sheet material passing immediately adjacent said delivering means; and means substantially in contact with the other of said sloping or slanting walls of said delivering means to regulate and control the amount and the thickness of said foam material being spread on said continuously advancing sheet material, whereby the time-exposure to air of said foam material before being spread on said continuously advancing sheet material is kept to a minimum.

4,089,297

DEVELOPING APPARATUS OF MAGNETIC BRUSH TYPE FOR ELECTROPHOTOGRAPHIC REPRODUCTION

Shizuo Morita, and Kiyoshi Kimura, both of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Nihonbashi-Muro, Japan

Filed Oct. 1, 1976, Ser. No. 728,792
Claims priority, application Japan, Oct. 7, 1975, 50-136326
Int. Cl.[2] G03G *15/06, 15/09*
U.S. Cl. 118—647 **3 Claims**



1. A developing apparatus of magnetic brush type comprising: an electrically conductive cylindrical member disposed adjacent to a photosensitive body and adapted to form heads of a developer on the outer circumference of said cylindrical member; a plurality of permanent magnets of different polarities arranged in proximity to and along the inner circumference of said cylindrical member; said cylindrical member being rotatable relative to said permanent magnets so that the developer rubs the surface of the photosensitive body with the heads thereof formed on the outer circumference of said cylindrical member; a d.c. power source; means for applying a d.c. bias voltage to the heads of the developer prior to its contact with said photosensitive body; both the cylindrical member and the d.c. bias voltage applying means being electrically connected to said d.c. power source; said d.c. bias voltage applying means being a head cutting plate disposed oppositely to said cylindrical member so as to extend widthwise of the photosensitive body, said d.c. bias voltage applied to said cylindrical member being of the same polarity and magnitude as that applied to the d.c. bias voltage apply means.

4,089,298

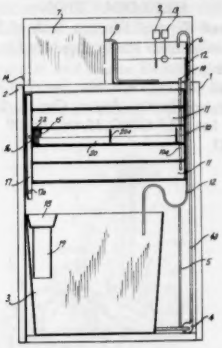
APPARATUS FOR THE STORAGE AND TRANSPORTATION OF CRUSTACEANS

William John Wilson, Foxrock, Ireland, assignor to Trans-Homard-Lang Limited, Ireland

Filed May 5, 1976, Ser. No. 683,673
Claims priority, application Ireland, May 5, 1975, 1002/75
Int. Cl.[2] A01K *63/00*
U.S. Cl. 119—2 **2 Claims**

1. Apparatus for the live storage and transport of table fish, especially table shellfish, said apparatus comprising an assembly of tubular containers joined together in side-by-side relation for positioning within a housing in layers, a fish-supporting trough separately withdrawably housed in each tubular container in closing relation, each container and its respective trough defining a discrete compartment, and means coupled to each compartment for delivering water into and removing water from each compartment, wherein each tubular container has at least one open end, and the respective trough has a plug closing said container open end, said plug including two plug

members accommodating a sealing member therebetween, and said plug members being operable to expand said sealing member outwardly into contact with an interior wall of the open end of the respective tubular container.

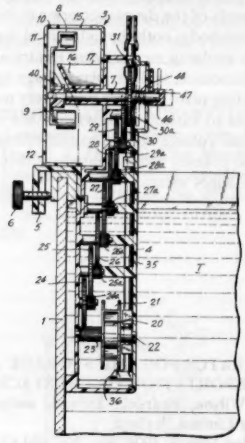


4,089,299

AIR-OPERATED FISH FEEDER

Bernard Suchowski, Marlboro, N.J., assignor to The Hartz Mountain Corporation, Harrison, N.J.

Filed Dec. 17, 1976, Ser. No. 751,810
Int. Cl.[2] A01K *61/02*
U.S. Cl. 119—51 R **9 Claims**



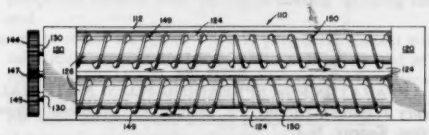
1. An apparatus for periodically dispensing measured quantities of food to an aquarium comprising means to release air below the surface of the aquarium water, drive means having means to collect at least a portion of the released air, the drive means being moveable by the buoyancy of a quantity of collected air, a driving shaft located below the surface of the aquarium water connected to a driven shaft located above the surface of the aquarium water by a speed reduction means, said drive means being connected to said driving shaft to cause rotation thereof, and a feed measuring cup connected to said driven shaft and being rotatable with said driven shaft between a supply of feed and a feed dispensing passageway to convey a measured quantity of feed from said supply to said passageway.

4,089,300

AUGER ASSEMBLY FOR USE IN FEED DISPENSING HOPPERS

Everett M. Keen, and Anthony J. Siciliano, both of Vineland, N.J., assignors to Diamond International Corporation, New York, N.Y.

Continuation of Ser. No. 629,661, Nov. 6, 1975, abandoned. This application Mar. 14, 1977, Ser. No. 777,743
Int. Cl.[2] A01K *5/02*
U.S. Cl. 119—52 AF **1 Claim**



1. An auger assembly for use in feed dispensing hoppers to dispense feed into a plurality of feed troughs each of which are spaced a substantial distance away from each other, comprising in combination an elongate housing having a plurality of feed dispensing openings adjacent to an underside thereof, tubular extension means attached to at least one of said openings through which feed may be dispensed into a feed trough spaced apart vertically from a feed trough to receive feed from others of said openings, web portions extending above each of said dispensing openings to prevent feed from gravitating directly through said dispensing openings, and a feed admitting cutout portion longitudinally spaced from each of said dispensing openings and on the upper side of said housing, feed conveying means disposed in said housing between said upper side and said underside for conveying feed admitted into said housing through said cutout portion toward each of said dispensing openings to effect dispensing therethrough and into different feed troughs spaced apart from each other, said conveying means including a plurality of individual auger sections, said housing also comprising a twin-bed portion and said conveying means comprising twin-auger units, some of said auger sections forming a first unit of said twin-auger units, and others of said auger sections forming a second unit of said twin-auger units, auger sections of each of said first and second auger units being arranged in in-line relationship along respective halves of said twin-bed portion, each half of said twin-bed portion including a plurality of separate and distinct ones of said feed dispensing openings whereby feed may be dispensed from said auger housing at different locations along the length thereof and at opposite sides thereof, adjacent ones of said auger sections in each of said units in addition to being in in-line relationship with each other also having screws of opposite hand for conveying feed in opposite directions and toward dispensing openings at opposite or remote ends thereof, the various auger sections of said first and second auger units having bores through which first and second drive shafts extend and being secured respectively thereto, and separate gears are attached to one end of each of said drive shafts and are in driving engagement with a common idler pinion whereby said drive shafts may be driving in the same direction at all times.

4,089,301

FEEDER FOR HAY BALES AND STACKS

Richard L. Harden, R.R. 1, Lineville, Iowa 50147

Filed Jul. 29, 1976, Ser. No. 709,862
Int. Cl.[2] A01K *5/00*
U.S. Cl. 119—60 **4 Claims**

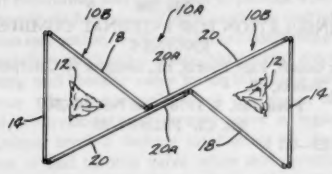
1. An animal adjustable hay feeder comprising an endless enclosure including six pivotally interconnected sections movable in response to feeding animals between a rectangular shape to a pair of triangular shapes,

adjacent pivotally interconnected sections including a pin and a sleeve on one section in registering alignment and

engagement with a sleeve and a pin respectively on the other section,

said enclosure having opposite end sections and oppositely disposed sides with each side having a pair of sections,

each pair of side sections include a long and a short section, said long sections in said opposite sides being diagonally



disposed and said short sections in said opposite sides being diagonally disposed whereby upon said sides being moved towards each other said long sections move into overlapping closely adjacent parallel planes and said short sections move into spaced apart parallel planes thereby forming a pair of spaced apart triangular shaped feeding enclosures.

4,089,302

CAST METAL HEAT EXCHANGER, AS WELL AS MOULD THEREFOR

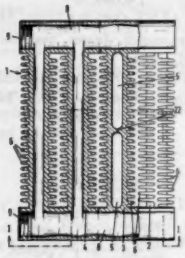
Johann Maria Ensink, Apeldoorn, Netherlands, assignor to Remeha Fabrieken br - The Netherlands, Apeldoorn, Netherlands

Filed May 12, 1976, Ser. No. 685,565

Claims priority, application Netherlands, May 16, 1975, 7505816

Int. Cl.² F22B *21/34*

U.S. Cl. 122—225 R **2 Claims**



1. A cast metal heat exchanger comprising a plurality of sections, each said section comprising at least a pair of spaced apart means for defining passages for a first fluid and wall means defining hollows therebetween for the passage of a said first fluid, said hollows being in fluid communication with the passages defined by said spaced apart means, said wall means comprising heat exchange projections on the exterior thereof, the passage defining means of a first said section being cast integral and in fluid communication with the passage defining means of a section adjacent thereto, and passage means defined by the exteriors of adjacent wall means for the passage of a second fluid in contact with the said projections thereon.

4,089,303

BOILER OR VAPOR GENERATOR USING CATALYTIC COMBUSTION OF HYDROCARBONS

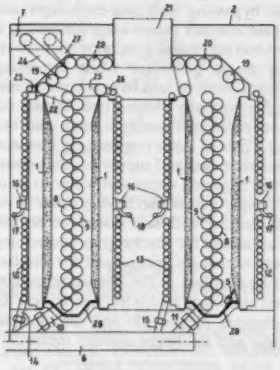
André Brulfert, 6 rue des Pentres Parrocel, Avignon, France

Filed Jun. 2, 1976, Ser. No. 692,111

Claims priority, application France, Jun. 3, 1975, 75 17850

Int. Cl.² F22B *27/08*; F23D *13/18*

U.S. Cl. 122—250 R **12 Claims**



1. A boiler or steam generator comprising:

a thermally insulated housing;

at least one pair of vertically disposed spacedly juxtaposed catalyst elements received in said housing for catalytic combustion of a fuel to produce heat;

a pair of imbricated tube coils having vertical axes and disposed between but spaced from said elements and forming a radiation shield between them preventing direct radiation of one of said elements onto another;

means for feeding a liquid to be heated to said coils at the bottom of said housing; and

a collector for heated fluid communicating with said coils at the top thereof.

4,089,304

APPARATUS FOR SUPPLYING FEEDWATER TO A STEAM GENERATOR

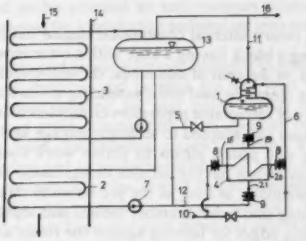
Georg Beckmann, Vienna, Austria, assignor to Waagner-Biro Aktiengesellschaft, Austria

Filed Oct. 20, 1976, Ser. No. 734,339

Claims priority, application Austria, Oct. 23, 1975, 8077/75

Int. Cl.² F22D *1/00, 1/32*

U.S. Cl. 122—412 **10 Claims**



1. In an apparatus for supplying feedwater to a steam generator, such as a waste-heat boiler, degassing means for degassing water by heating the same to boiling temperature, supply conduict means communicating with said degassing means for supplying feedwater thereto to be degassed therein, discharge conduit means communicating with said degassing means for

discharging degassed water therefrom, heat-exchanger means communicating with both of said conduit means for extracting heat from the degassed water and delivering the latter heat to the water which is to be degassed, said discharge conduit means communicating downstream of said heat-exchanger means with a steam generator for delivering degassed water thereto at a temperature less than the temperature of the water at the degassing means, supply bypass conduit means communicating with said degassing means for supplying feedwater thereto while bypassing said heat-exchanger means and discharging bypass conduit means communicating with said degassing means and said steam generator for delivering degassed water to the steam generator while bypassing said heat-exchanger means, both of said bypass conduit means carrying valve means for normally closing both bypass conduit means while said heat-exchanger means is used, said heat-exchanger means having a pair of inlets respectively connected with said discharge conduit means and supply conduit means for respectively receiving degassed water and water to be degassed, and said heat-exchanger means also having a pair of outlets respectively communicating with said discharge conduit means and supply conduit means for discharging cooled degassed water from said heat exchanger means and for discharging heated feedwater to be supplied to the degassing means, and valved means situated at each of said inlets and outlets for connecting said heat-exchanger means into and disconnecting the same from the supply and discharge conduit means.

4,089,305

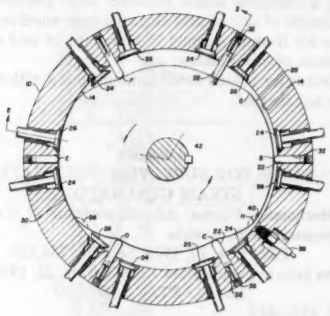
ROTARY INTERNAL COMBUSTION ENGINE

Oscar P. Gregg, 2928 Fort Henry Dr., Kingsport, Tenn. 37664

Continuation-in-part of Ser. No. 564,736, Apr. 3, 1975, abandoned. This application Mar. 24, 1976, Ser. No. 669,955

Int. Cl.[2] F02B *53/00*; F01C *19/04*

U.S. Cl. 123—244 **7 Claims**



2. In a rotary internal combustion engine having a housing comprising a block having a bore with a rotor mounted therein and heads on the ends of said block, the improvement comprising piston means on said rotor extending toward said housing, a plurality of retractable separators circumferentially spaced in said housing and adapted to sealingly engage said rotor means including said piston means to define work chamber means, said piston means having arcuate compression face means at least substantially as long as the arc between adjacent separators forming said work chamber means, said separators having dual sealing edges for bearing against the rotor, and intake and exhaust port means communicating with said work chamber means, and comprising at least one power piston and at least one service piston circumferentially spaced on said rotor and extending toward the wall of said bore, wherein the arc of the compression face means and the arc of the bore are essentially concentric, and wherein there are two oppositely disposed power pistons and two oppositely disposed service pistons on the rotor, and wherein the separators comprise two segments in side by side sliding arrangement, each segment having a flange on its inner end flared away from the other flange to provide a conduit therebetween in conjunction with the rotor surface, and aperture means in said housing communicating with the atmosphere and with said conduit to provide a pressure drop across each of said flanges.

4,089,306

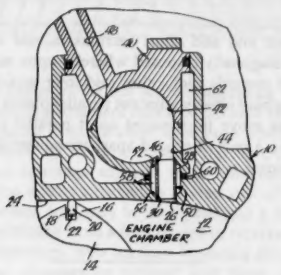
PORT INSULATION FOR INTERNAL COMBUSTION ENGINES

Alexander Goloff, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jun. 9, 1976, Ser. No. 694,507

Int. Cl.[2] F02B *19/18*

U.S. Cl. 123—32 K **3 Claims**



1. In an internal combustion engine, the combination of:
a housing defining a combustion chamber;
a piston movable within said housing;
a port in said housing and opening into said chamber;
a tube within said port having a free end snugly received by and movable within said port closely adjacent said combustion chamber;
insulating means on the exterior of said tube whereby heat flow from said tube to said housing is minimized; and
a second housing defining a chamber having an outlet;
said tube having an end remote from said free end and secured to said second housing about said outlet.

4,089,307

THROTTLE VALVE OPERATING MECHANISM

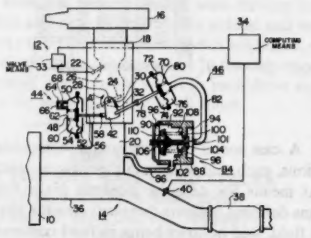
Koyo Nakamura, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Feb. 5, 1976, Ser. No. 655,450

Claims priority, application Japan, Feb. 10, 1975, 50-17106

Int. Cl.[2] F02D *33/00*

U.S. Cl. 123—97 B **2 Claims**



1. In an internal combustion engine system including an internal combustion engine; an intake system having an electrically controlled carburetor with an air-fuel mixture passage and a throttle valve rotatably mounted in said mixture passage; a throttle shaft rotatably mounted said throttle; an exhaust system having therein a three-way catalytic converter capable

of converting hydrocarbons, carbon monoxide and nitrogen oxides into harmless compounds; an exhaust gas sensor operatively disposed in said exhaust system upstream of said converter for producing an information signal representing and corresponding to the concentration of a given component of the exhaust gases emitted from said engine; and computing means for controlling said carburetor to provide a substantially stoichiometric air-fuel mixture upon receiving said information signal from said sensor, the improvement comprising a throttle valve operating mechanism connected to said throttle valve for rotating said throttle valve to slightly open said air-fuel passageway when the magnitude of vacuum in said intake system downstream of said throttle valve is higher than a predetermined level, a dashpot mechanism for damping the movement of said throttle valve when said throttle valve is quickly rotated in a direction to close said air-fuel mixture passage in response to rapid engine deceleration whereby creation of extremely high vacuum in said intake system downstream of said throttle valve is prevented even in case of engine deceleration; said throttle valve operating mechanism comprising a lever fixed at the one end thereof to said throttle shaft to rotate therewith, said lever having at the other end thereof a projection; a swingable arm rotatably connected at one end thereof to said throttle shaft and engageable at one side thereof with said projection to rotate said lever and thus said throttle valve in a direction to open said throttle valve when rotated in one direction a predetermined distance; a diaphragm unit having therein a diaphragm movable in response to development of a vacuum therein; a linkage connecting a free end of said swingable arm with said diaphragm to rotate said swingable arm in said one direction upon said development of a vacuum; a controller for providing fluid communication between said diaphragm unit and an interior of said intake system downstream of said throttle valve when the magnitude of vacuum in said intake system downstream of said throttle valve is higher than the predetermined level; said controller comprising a cylinder casing having therein first, second and third chambers, a diaphragm separating said first and second chambers, a partition wall separating said second and third chambers, said partition wall defining a valve seat at the central portion thereof, and said second chamber and third chamber communicating with the interior of said intake system downstream of said throttle valve and said diaphragm unit, respectively; a valve plunger having at one end thereof a valve head and having through the entire longitudinal length thereof an air bleed passage, said valve plunger being sealingly passed through and connected to said diaphragm and arranged such that said valve head is sealably engageable with said valve seat; and a compression spring disposed in said second chamber between said diaphragm and said partition wall to urge said diaphragm toward said first chamber.

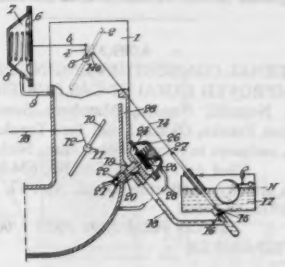
4,089,308

CARBURATION DEVICES

Michel Pierlot, Le Pecq, France, assignor to Societe Industrielle de Brevets et d'Etudes S.I.B.E., France

Filed Oct. 8, 1976, Ser. No. 730,740
Claims priority, application France, Oct. 31, 1975, 75 33315
Int. Cl.[2] F02M *9/08*
U.S. Cl. 123—119 R **5 Claims**

1. A carburation device for an internal combustion engine comprising auxiliary throttle means in the intake pipe upstream of driver-actuated main throttle means, the auxiliary means opening automatically and progressively in proportion to the increase in the flow rate of air through the intake pipe and proportioning means controlled by the auxiliary throttle means and metering the flow rate of fuel drawn into the intake pipe downstream of the main throttle means via passage means including a chamber which is kept at a pressure substantially equal to the pressure in the portion of the intake pipe between the two throttle means by a bypass passage connecting said portion and chamber, having control means which are sensitive to at least one engine operating parameter and, in operation, adjust a control cross-sectional area in the part of the passage means between the chamber and the intake pipe.

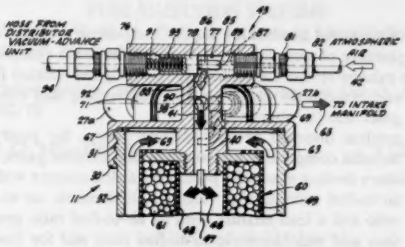


4,089,309

CRANKCASE EMISSION SEPARATOR AND COLLECTOR

Elmer W. Bush, 2010 Trimble Way, Sacramento, Calif. 95825

Filed Dec. 31, 1975, Ser. No. 645,900
Int. Cl.[2] F02M *25/06*; B01D *39/06*
U.S. Cl. 123—119 B **7 Claims**



1. A crankcase emission fluid separator for use with an engine having a crankcase, an air intake leading to a combustion chamber and a vacuum source, said separator comprising:

a housing forming an enclosure and including inlet means adapted to be coupled to said engine crankcase for admitting emisions therefrom to the interior of said housing, outlet means adapted to be coupled to said air intake for furnishing separated fluids thereto, vacuum port means adapted to be coupled to said vacuum source, and air intake means for introducing ambient air into said housing; and

means within said housing for conditioning engine crankcase emissions entering said housing via said inlet means and leaving said housing via said outlet means to separate liquid and solid components from gaseous components thereof, said conditioning means including a container having first and second apertured walls and a plurality of relatively inert particles located in said container between said walls and providing a barrier through which said emissions pass from said inlet means to said outlet means, fluid conduit means having a first end terminating adjacent one of said first and second container walls and a second end in fluid communication with said inlet means and said air intake means, and valve means coupled to said vacuum port means for controlling the quantity of ambient air admitted to said fluid conduit means in accordance with the magnitude of said vacuum source, said valve means including bias means for limiting the admission of ambient air into said fluid conduit means to a minimum

amount when the magnitude of said vacuum source is a minimum and for permitting the amount of ambient air admitted to said fluid conduit means to increase as the magnitude of said vacuum source increases.

4,089,310

INTERNAL COMBUSTION ENGINE PROVIDING IMPROVED EXHAUST-GAS PURIFICATION

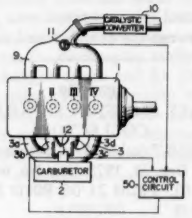
Masaaki Noguchi, Nagoya; Masaharu Sumiyoshi, Toyota; Yukiyasu Tanaka, Okazaki, and Taro Tanaka, Chiryu, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Apr. 8, 1976, Ser. No. 674,876

Claims priority, application Japan, Apr. 17, 1975, 50-46687; Jul. 10, 1975, 50-84962

Int. Cl.[2] F02M *7/00*; F02B *3/00*

U.S. Cl. 123—119 LR **14 Claims**



1. An internal combustion engine comprising:

a plurality of sequentially operative combustion chambers;

an exhaust system for gathering exhaust gases emitted from said combustion chambers and discharging said exhaust gases into the atmosphere;

a catalyst disposed in said exhaust system for purifying harmful components contained in said exhaust gases;

mixture feeding means for producing a rich mixture with an air-to-fuel ratio smaller than a stoichiometric air-to-fuel ratio and a lean mixture with an air-to-fuel ratio greater than said stoichiometric air-to-fuel ratio and for feeding said rich mixture to at least one of said combustion chambers and said lean mixture to the remainder of said combustion chambers during at least a time when the temperature of said catalyst is above a value where said catalyst operates effectively;

air/fuel ratio detecting means disposed in said exhaust system for detecting the composition of said gathered exhaust gases as a whole and detecting the total air-to-fuel ratio of said rich and lean mixtures to generate an output signal; and

control means responsive to the output signal of said air/fuel ratio detecting means for adjusting the air-to-fuel ratio of one of said rich and lean mixtures to maintain said total air-to-fuel rato at a predetermined air-to-fuel ratio.

4,089,311

FUEL SUPPLY SYSTEM FOR INTERNAL COMBUSTION ENGINES

Johannes Brettschneider, Ludwigsburg; Valerio Bianchi, Hochdorf; Osvaldo Bejerman, Stuttgart; Lorenz Bundesen, Flensburg, and Hans Zeller, Grafenau, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Jul. 8, 1976, Ser. No. 701,407

Claims priority, application Germany, Jul. 8, 1975, 2530314

Int. Cl.[2] F02M *7/02*

U.S. Cl. 123—119 EC **18 Claims**

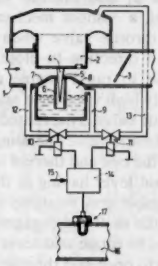
1. A fuel supply system for an internal combustion engine, said engine including an induction manifold and an exhaust manifold, comprising:

a fuel reservoir connected by at least two separate conduits with different respective regions of said induction manifold;

electromagnetic valve means disposed in each of said conduits for controlling the air pressure in said reservoir;

an electric controller for actuating said electromagnetic valve means in mutually opposed phase relationship; and

an oxygen sensor disposed in said exhaust manifold for generating a signal for said controller and wherein said controller includes means for generating a set-point signal, means for comparing said set-point signal with the signal from said oxygen sensor and means for opening one of the



electromagnetic valves in said conduit leading to a region of relatively lower pressure in said induction manifold when said signal from said oxygen sensor is higher than said set-point signal and for opening the other of said electromagnetic valves in said conduit leading to a region of relatively higher pressure in said induction manifold when said signal from said oxygen sensor is lower than said set-point signal, and wherein said electric controller is connected to be triggered by the ignition pulses of the engine to open said electromagnetic valves for a constant period of time.

4,089,312

MEANS FOR INTRODUCING ADDITIONAL AIR INTO AIR FUEL STREAM OF INTERNAL COMBUSTION ENGINES

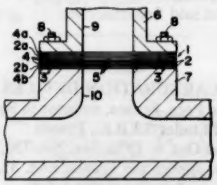
Jack Kenneth Ibbott, 4-17-7 Nishi Azabu, Minato-ku, Tokyo, Japan

Filed Sep. 5, 1975, Ser. No. 610,885

Claims priority, application Japan, Sep. 2, 1975, 50-106475

Int. Cl.[2] F02M *23/00*

U.S. Cl. 123—119 D **22 Claims**



1. A device for introducing additional air into an air-gas mixture flowing through an intake passage from a carburetor to combustion chambers of an internal combustion engine, said device comprising:

a member adapted to be mounted between the carburetor and combustion chambers;

said member having extending therethrough a center opening forming a portion of the intake passage when said member is so mounted, said center opening being no greater in size than the intake passage;

a plurality of space means, extending through said member

peripherally of said center opening, for, when said member is so mounted, communicating the atmosphere with said center opening and for thus introducing additional air from the atmosphere to the air-gas mixture in the intake passage; and

each said space means having a size below that critical value which would allow the additional air passing therethrough to cause cross turbulence in the air-gas mixture passing through the intake passage, when said member is so mounted.

4,089,313

CLOSED-LOOP AIR-FUEL MIXTURE CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINES WITH MEANS FOR MINIMIZING VOLTAGE SWING DURING TRANSIENT ENGINE OPERATING CONDITIONS

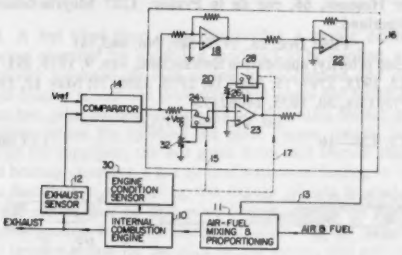
Masaharu Asano, Yokohama, and Nobuzi Manaka, Yokosuka, both of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Aug. 3, 1976, Ser. No. 711,211

Claims priority, application Japan, Aug. 5, 1975, 50-94746

Int. Cl.² F02M *7/00*

U.S. Cl. 123—119 EC **7 Claims**



1. Fuel control apparatus for an internal combustion engine including sensing means for sensing the concentration of a component within a composition of exhaust gases from an internal combustion engine and providing an electrical signal representative of the sensed concentration; air-fuel supplying means for supplying air and fuel to the engine in a variable ratio; an integral controller connected to the exhaust composition sensing means to process the electrical signal and apply a feedback signal to the air-fuel supplying means to effect a minimum amount of noxious components in the exhaust gases from the engine;

means for sensing transient operating conditions of the engine; and

switching means responsive to the sensed operating conditions of the engine for disconnecting passage of said electrical signal to the integral controller and connecting a predetermined DC voltage to said air-fuel supplying means.

4,089,314

CARBURETOR

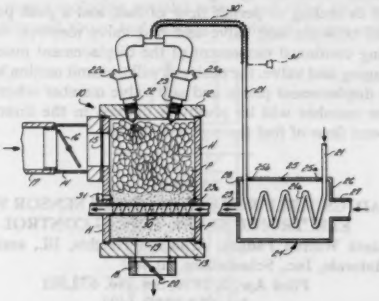
Gunther Bernecker, Montvale, N.J., assignor to Donald B. Conlin, Mahwah, N.J., a part interest

Continuation-in-part of Ser. No. 770,964, Feb. 22, 1977. This application Jun. 15, 1977, Ser. No. 806,798

Int. Cl.² F02M *31/00*

U.S. Cl. 123—133 **4 Claims**

1. A carburetor for supplying a fuel/air mixture to an internal combustion engine having an intake manifold comprising a housing, contained in the housing only matter which is inert relative to the fuel, said matter being porous, means for transferring heat from the exhaust gases of the engine to the housing and the porous matter, means for injecting at least partially liquid fuel into the housing and onto said porous matter, means for heating all the fuel which is injected into the housing sufficiently before the fuel leaves the housing so that all the fuel is completely vaporized when it leaves the housing, means for admitting air into the housing simultaneously with the injection of the fuel to form a mixture with all the vaporized fuel and means for conducting the entire mixture out of the housing directly to the intake manifold during all phases of operation of the engine for combustion in the engine.



4,089,315

FUEL INJECTION SYSTEMS

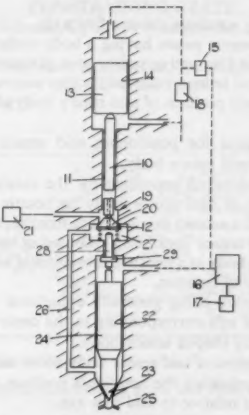
Paul Lakra, Wembley, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Sep. 27, 1976, Ser. No. 727,230

Claims priority, application United Kingdom, Oct. 3, 1975, 40482/75

Int. Cl.² F02M *39/02*

U.S. Cl. 123—139 AK **6 Claims**



1. A fuel injection system for supplying fuel to an internal combustion engine comprising a displacment piston movable within a first cylinder for generating a first fluid pressure, an outlet from one end of the cylinder, a valve engageable by said piston during the movement of the piston towards said one end of the cylinder, said valve when operated by said piston acting to lower the first pressure in said one end of the cylinder, a second cylinder for generating a second fluid pressure, a stepped valve member slidable in said second cylinder, the narrower end of said valve member being shaped to co-operate with a seating defined at one end of said second cylinder to control the flow of fuel through an orifice from said one end of

the second cylinder, the wider end of said valve member being subject to said second fluid pressure to urge the valve member into contact with the seating, the area defined between the narrower and wider portions of the valve member being subject to said first pressure at said outlet whereby when said first pressure is sufficiently high the valve member will be lifted from its seating to permit flow of fuel, and a push pin interposed between said valve and said valve member, whereby during continued movement of the displacement piston after engaging said valve, the push pin will transmit motion between said displacement piston and said valve member whereby the valve member will be positively moved in the direction to prevent flow of fuel through said orifice.

4,089,316

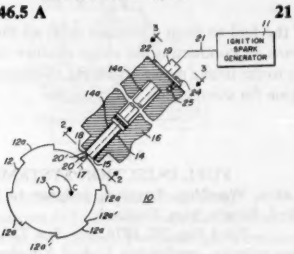
ADJUSTABLE ROTARY POSITION SENSOR FOR ELECTRONIC SPARK TIMING CONTROL

Kenneth Warren Padgitt, Arlington Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 5, 1976, Ser. No. 673,501

Int. Cl.[2] F02P *1/00*

U.S. Cl. 123—146.5 A **21 Claims**



1. An improved adjustable position sensor assembly comprising:

a rotary body rotatable about a first axis;

at least one sensor means having a body with first and second ends and an active sensor area positioned at one of said first and second ends, said active sensor area sensing the rotational position of said rotary body about said first axis; and

mounting means for positioning said sensor means with respect to said rotary body,

said mounting means providing for the rotational position adjustment of said sensor body by rotating said sensor body about a second axis different from said first axis and said active sensor area being disposed at said one end of said sensor body at a distance substantially away from said second axis of rotation,

said sensor body being generally cylindrical in shape and said second axis corresponding to the central axis of said cylindrically shaped sensor body,

whereby rotation of said sensor body about said second axis results in adjusting the rotational position of said active sensor area relative to said first axis.

4,089,317

APPARATUS FOR MIXTURE ENRICHMENT IN AN INTERNAL COMBUSTION ENGINE

Ulrich Drews, Vaihingen-Pulverdingen; Lothar Winkelmann, Ludwigsburg, and Hans Schnürle, Walheim, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed May 12, 1976, Ser. No. 685,649

Claims priority, application Germany, May 20, 1975, 2522283

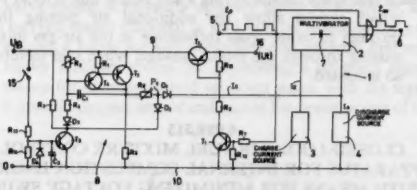
Int. Cl.[2] F02B *3/00*

U.S. Cl. 123—179 L **9 Claims**

1. An apparatus for controlling fuel injection to an internal combustion engine, comprising:

a fuel injection control circuit with first multivibrator means for generating fuel injection control pulses in dependence on engine rpm and air flow rate; and

a timing circuit for changing said control pulses to thereby engender fuel mixture enrichment, said timing circuit



including voltage supply means for generating a supply voltage to said timing circuit as a function of engine temperature, said voltage supply means including switching means for altering the continuity of said supply voltage as a function of engine speed and engine load.

4,089,318

SPRING TYPE ARTICLE PROJECTING DEVICE

Walter Hesener, 66, rue de la Prulay, 1217 Meyrin-Geneve, Switzerland

Filed Dec. 23, 1975, Ser. No. 643,741

Claims priority, application Switzerland, Jan. 9, 1975, 291/75; Feb. 13, 1975, 1797/75; Mar. 14, 1975, 3398/75; May 12, 1975, 6170/75; Oct. 30, 1975, 14082/75

Int. Cl.[2] F41B *7/00*

U.S. Cl. 124—16 **17 Claims**

1. An article projecting apparatus having a cockable and releasable mechanical percussion mechanism for hitting an object, such as a ball, in a desired direction, said apparatus comprising: a stock having first and second ends, the first end having an integral extension comprising a handle and the second end having an integral extension comprising a stricker head housing, a striker plate positioned on an elongated side of said striker head housing and pivotally mounted thereon for movement transversely with respect to the longitudinal direction of the stock; a cocking member positioned within said stock and adapted to be moved manually into selected positions against the action of a spring means; means for manually releasing the cocking member from said selected positions; said cocking member including a striking pin which has a striking end; a force deflector member in the form of an angle lever and disposed below the striker plate when the apparatus is in a horizontal position and said stricker plate faces upwardly, said deflector member being rotatable about a fixed axis in the striker head housing and having a first angular position which is independent of the possible cocked positions of the striker pin, said positions being occupied by the stricking pin prior to its striking movement, the force deflecting member, upon receipt of an impact from the striker pin, being deflected and causing a ball striking movement of the striker plate; said striker plate having a rest position independent of the positions to which the cocking member is moved, said striker head housing having to a terminal edge which is adjacent to a forward or the lower most free end of said striker plate when the deflector member is not engaged by the striker pin, the movement of the striker plate being such that a ball positioned adjacent said striker head housing is engaged from behind when the apparatus is in an operative position by insertion of

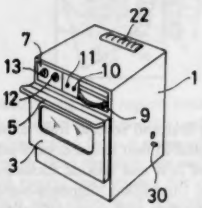
the edge and the free end of said striker plate under a portion of the circumference of a ball.

4,089,319

HOT BLAST TYPE OVEN

Kazumi Tamada; Sueo Mizuno; Tadayoshi Takase; Masahiko Koumura, and Shinichi Soma, all of c/o Rinnai Kabushiki Kaisha, of 2-26, Fukuzumi-cho, Nakagawa-ku, Nagoya-shi, Aichi-ken, Japan

Filed Dec. 17, 1976, Ser. No. 751,972
Claims priority, application Japan, Dec. 22, 1975, 50-151888
Int. Cl.[2] F24C *15/32*
U.S. Cl. 126—21 A **7 Claims**



1. A hot blast type oven comprising a casing defining a heating chamber for receiving foodstuff to be cooked, a door pivotally mounted on said casing to be opened and closed, main burner means for producing hot gases for heating said chamber, pilot burner means adjacent said main burner means, ignition means for igniting the pilot burner means, blower means for supplying the hot gases from said burner means to said heating chamber, a gas control section including an operation handle for controlling the supply of gas to said main burner means and to said pilot burner means, an electrical control section for controlling said main blower means and said ignition means for the pilot burner means, said gas control section and said electrical control section being constituted as respective units, means detachably connecting these two units together in a combined relative position so that they can be mutually operated, and means coupling said control sections to one another and said door for locking said operation handle when the door is closed and for releasing said handle when the door is opened to permit ignition of said ignition means and lighting of said pilot burner means by operation of said handle, said electrical control section including a timer switch means operatively associated with the coupling means for selectively controlling continuous or limited time of energization of said blower means and gas supply to said main burner means after lighting of the pilot burner means and closure of said door.

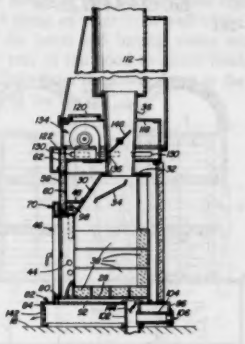
4,089,320

FIREPLACE FOR MOBILE HOME

Roy R. Brown, 2190 Plumas, and Bernard A. Rilea, 16217 Pinon Rd., both of Reno, Nev. 89502

Filed Apr. 14, 1976, Ser. No. 676,812
Int. Cl.[2] F24B *1/18*
U.S. Cl. 126—121 **4 Claims**

1. A fireplace construction including a hollow base, a firebox including interconnected opposite side, rear and bottom wall means mounted on and overlying said base and including an open front side, closed, hollow and vertically extending heating air plenum means disposed outwardly of said firebox including interconnected opposite side, rear and top wall portions and a front wall portion extending between and interconnecting the forward marginal edge portions of said side and top wall portions, said heating air plenum means enclosing said firebox therewithin, said front wall portion being provided with an opening through which the front side of said firebox opens, said base including upstanding peripheral walls, one of said upstanding walls having heated air outlet openings formed therein, the lower portion of said heating air plenum means opening into said base, closed, hollow combustion air plenum means within the confines of said heating air plenum means exteriorly of said firebox and extending peripherally about said open front side of said firebox and opening into the latter through openings spaced along the forward marginal edges of at least two of the walls of said firebox, said combustion air plenum means including air inlet means, and room air plenum means disposed above said heating air plenum means and including air inlet means therefor, air outlet means opening into an upper portion of said heating air plenum means and electric motor driver air pump means for pumping ambient room air through said room air plenum means into said heating air plenum means, said combustion air plenum means including a portion isolated from the remainder of said combustion air plenum means including outlet means opening into said fireplace and restricted inlet means opening into said heating air plenum means downstream from said air pump means.

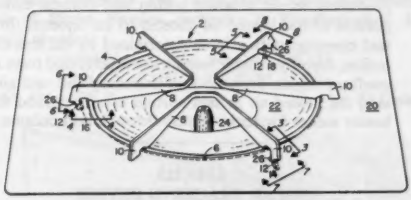


4,089,321

CONSTRAINING GRATE

Vladimir J. Ondrasik, II, 17044 Westbury Dr., Granada Hills, Calif. 91344

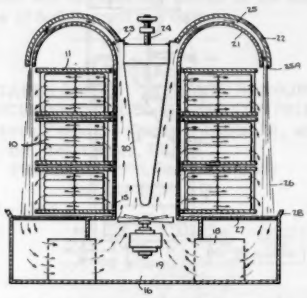
Filed Feb. 6, 1976, Ser. No. 655,889
Int. Cl.[2] F24C *15/10*
U.S. Cl. 126—215 **4 Claims**



1. An improved constraining grate and receiving unit which comprises:
   a. a resilient structural circumferential member;
   b. a means for support attached to said structural member, said support means having at least three protrusions distributed around the extending outside of said structural member, three of said protrusions having downward projections said protrusions having downward projections being distributed around said structural member and said support means being adapted to hold articles placed thereon;
   c. a means for compressing said structural member;
   d. a receiving unit surface having three holes therein, each of said holes being paired with one of said protrusions having downward projections, and said holes being positioned to accept said projections when said structural member is

circumferentially compressed, and to bind said projections within said holes when said compression is released.

4,089,322
FOOD PROCESSING TECHNIQUE
Raul Guibert, 8343 West 4th St., Los Angeles, Calif. 90048
Filed Aug. 12, 1976, Ser. No. 713,977
Claims priority, application Argentina, Aug. 18, 1975, 259761
Int. Cl.[2] A47G *23/04*
U.S. Cl. 126—261 **6 Claims**



1. Heating apparatus for heating food contained in trays having bottom spacers to provide air circulation spaces between the trays when they are vertically stacked, said apparatus comprising:

A. means to support said trays in like vertical stacks thereof in an annular array surrounding a central hollow column whose outer boundary is provided with openings through which heated air may be forced to pass through said spaces between said trays to transfer heat to the food therein;

B. heater means to provide heated air;

C. means to blow the heated air at a relatively high velocity through said column; and

D. a flow restriction at the outlet of the column having means including an orifice to receive the heated air blown therethrough and to conduct the heated air in a direction creating a heated air curtain surrounding the array of trays to isolate the trays from ambient air, said flow restriction producing an air pressure within said column causing a portion of the heated air therein to be injected through said openings with a force determined by the size of said orifice, thereby rapidly heating the food in said trays in the confined region between said boundary and said air curtain, the heated air in said curtain being returned to said heater means for recirculation through said column.

4,089,323
SOLAR TRACKING DEVICE
John Massey Trihey, Bayswater, Australia, assignor to Malz Nominees Pty. Ltd., Victoria, Australia
Filed Jul. 12, 1976, Ser. No. 704,674
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—270 **12 Claims**

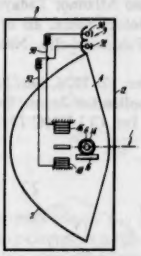
1. Solar energy converting apparatus comprising:

(a) focussing means having a focal plane;

(b) solar energy absorbing means located along the focal line of the focussing means;

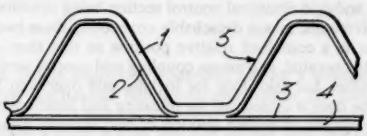
(c) a support structure including mounting means for rotatably mounting the focussing means about an axis which is co-incident with the focal line of the focussing means; and

(d) solar tracking means having an optical plane which is parallel to said focal plane, said tracking means including first and second heat extensible members which are arranged to receive equal amounts of heat from solar energy when the optical plane is directed at the sun and to receive unequal amounts of heat from solar energy when the optical plane is not directed at the sun, said extensible members being coupled to act between the support structure and the focussing means to cause rotation of the focussing means in accordance with the heat received by respective extensible members, and wherein the tracking



means includes first and second fluid expandable bellows which are coupled to first and second fluid filled elements respectively and first and second focussing elements, the first and second fluid filled elements being located at the focal lines of the first and second focussing elements respectively.

4,089,324
HEAT TRANSFER ELEMENT
Jan Tjaden, Durach, Germany, assignor to N.V. Internationale Octrooi Maatschappij "OCTROPA", Rotterdam, Netherlands
Filed Apr. 26, 1976, Ser. No. 680,278
Claims priority, application Germany, Apr. 26, 1975, 2518683
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **11 Claims**



1. A heat transfer element comprising:

a. at least one flat metal sheet coated with a weldable layer of plastic material;

b. at least one corrugated metal sheet coated with said weldable layer of plastic material, the plastic surfaces of said corrugated sheet and said flat sheet being bonded together in mutual contact zones forming parallel channels, said channels being open at both ends; and

c. a pair of hollow distributing channels, each said distributing channel adapted to receive one of said parallel channel ends therein for permitting fluid communication between said parallel channel and said distributing channel.

4,089,325
SOLAR HEATED BOILER
Gabriel Brola, Nogent-sur-Marne, France, assignor to Entreprise Industrielle de Chaudronnerie, France
Filed Jul. 12, 1976, Ser. No. 704,698
Claims priority, application France, Jul. 18, 1975, 75 22510
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **3 Claims**

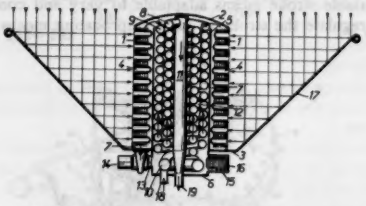
1. A solar boiler comprising in combination:

a curved surface provided with a plurality of adjacent cavities formed each with a blind tube, the length of which is at least two and half times its diameter, said tubes being

normal to the said surface and located on the concave side of it;

a reflector adapted to reflect solar rays towards said surface, and into said cavities;

a wall substantially parallel to said surface enclosing a region and defining with said surface a space in which said tubes extend;



means for subdividing said region into two adjacent parts one of which communicates with said space and the other of which is separated from it, means for circulating a first heat conveying fluid through the said space and said one part of said region, and means for circulating a second fluid through said other part whereby said second fluid can be heated by heat exchange with said first fluid.

4,089,326

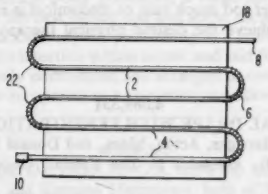
HEATER

Stella Andrassy, Ridge Rd., Kingston, N.J. 08528

Filed Dec. 13, 1976, Ser. No. 749,855

Int. Cl.[2] F24J *3/02*

U.S. Cl. 126—271 **2 Claims**



1. A solar fluid heater comprising a length of flexible tubing mounted in contact with a dark colored heat absorbing body with said tubing arranged with a plurality of sections thereof extending in parallel relation and connected at the ends thereof by return bend portions, and means for protecting said return bend portions from undesired expansion or distortion under the influence of heat and pressure including restraining means in the form of a coil of wire encircling the tubing and in contact therewith throughout said return bend portions, and means extending over said return bend portions in position to shield said portions from solar radiation.

4,089,327

KITCHEN EXHAUST SYSTEM

Clarke T. Welsh, Logansport, Ind., assignor to Logansport Distributor Inc., Logansport, Ind.

Filed Apr. 12, 1976, Ser. No. 675,762

Int. Cl.[2] F24C *15/08*; F23J *11/00*

U.S. Cl. 126—299 D **9 Claims**

1. A kitchen exhaust system comprising:

a hood for disposition above a cooking top;

a first blower for taking air from outside a building and discharging it into said hood;

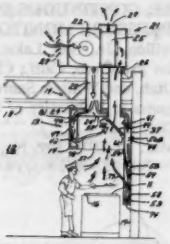
a second blower for taking air and fumes from inside said hood for discharge outside a building;

a lower plenum located below the hood and connected to said first blower for discharging outside air upward into the interior of said hood;

an exhaust outlet from said hood and connected to said second blower;

air outlet means in said hood coupled to said first blower including flow-directing means for discharging air from said first blower across the interior of said hood toward said exhaust outlet;

said air outlet means in said hood include registers horizontally spaced along an inner front wall of the hood near the bottom of the hood and having vanes inclined upward toward the rear of the hood to direct fresh air upwardly and rearwardly from the lower front to the upper rear of the interior of the hood;



said hood includes an upper plenum coupled to said first blower and receiving fresh air therefrom;

at least one fresh air conduit is connected to said upper plenum to receive fresh air from said fist blower and conduct it downwardly to said lower plenum; and

a second fresh air conduit horizontally spaced from said first conduit and generally parallel thereto and connected to said upper and lower plenums, said lower plenum being a horizontally extending tube having its opposite ends connected to said conduits; said conduits discharging fresh air into said opposite ends whereby air flow is toward the middle of said lower plenum.

4,089,328

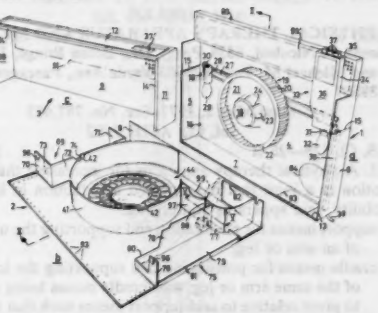
KITCHEN VENTILATOR

Nils Randolf Bergmark, and Thord Ingvar Eugen Westermark, both of Byske, Sweden, assignors to Futurumverken AB, Byske, Sweden

Filed Nov. 2, 1976, Ser. No. 738,333

Int. Cl.[2] F21C *15/08*; F23J *11/00*

U.S. Cl. 126—299 D **13 Claims**



1. A kitchen ventilator having a housing comprising a top wall, a bottom wall, a front wall, a rear wall and side walls; an air inlet opening in the bottom wall; at least one air outlet opening in the housing; a radial fan having a motor and a fan

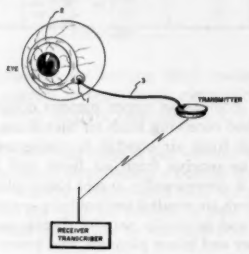
wheel adjacent the inlet opening, the fan wheel axis being perpendicular to the top wall and the fan motor lying substantially within the fan wheel; a fan housing surrounding the fan, the fan housing comprising a portion of the ventilator top wall, a portion of the ventilator bottom wall and a volute side wall totally bridging the distance between said top and bottom walls and having an air oulet opening; air ducts connecting the fan housing air outlet opening with the ventilator housing air outlet opening, said air ducts being defined by portions of said top wall, portions of said bottom wall and side walls, the fan housing side wall and the air duct side walls extending the entire distance between said top and bottom walls.

4,089,329

NONINVASIVE, CONTINUOUS INTRAOCULAR PRESSURE MONITOR

Lucien Alfred Couvillon, Jr., Salt Lake City, Utah; Thomas Reaks Grover, San Francisco, Calif.; Charles Dewitt Baker, Salt Lake City, Utah, and William Sanford Topham, Chagrin Falls, Ohio, assignors to University of Utah Research Institute, Salt Lake City, Utah

Filed Mar. 18, 1976, Ser. No. 668,020
Int. Cl.² A61B *3/16*
U.S. Cl. 128—2 T **11 Claims**



1. A noninvasive monitoring device for measuring intraocular pressure, comprising

a. pressure transducer means adapted to contact and applanate a portion of a scleral surface for responsive detection of intraocular pressure changes reflected at said scleral surface, and

b. holder means operable to position and independently retain the transducer means in said scleral contact, said holder being made of materials chemically and mechanically compatible with an ocular environment.

4,089,330

PHYSICAL THERAPY APPARATUS AND METHOD

Joseph P. Nicolosi, 6539 Peggy Dr., Baton Rouge, La. 70808, and Michael M. Turner, 3603 Verde Ave., Pascagoula, Miss. 39567

Filed May 2, 1977, Ser. No. 787,693
Int. Cl.² A61H *1/02*
U.S. Cl. 128—25 R **36 Claims**

1. A physical therapy apparatus for increasing the range of motion in a joint that has suffered a reduction in its normal mobility, said apparatus comprising:

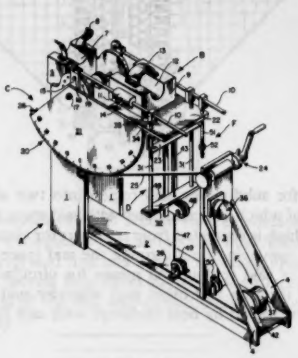
support means for positioning and supporting the upper limb of an arm or leg;

cradle means for positioning and supporting the lower limb of the same arm or leg, said cradle means being adaptable to pivot relative to said support means such that the resulting axis of rotation coincides with the axis of rotation at the joint between the lower and upper limbs during pivotal movement of the lower limb relative to the upper limb, and said cradle means further being adaptable to pivot from an initial treatment position to a variable terminal treatment position;

positioning means for selectively setting the position of said cradle means relative to said support means at the initial treatment position;

reciprocating means adaptable to reciprocate said cradle means from the initial treatment position to the variable terminal treatment position so as to permit continuous reciprocal pivotal movement of the lower limb relative to the upper limb;

variable stroke means adaptable to vary and controllably regulate the stroke of said reciprocating means so as to



permit the variable terminal treatment position to be controllably varied; and

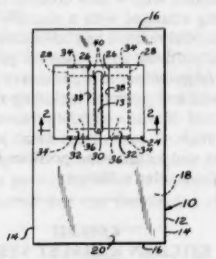
variable power means to operably drive said reciprocating means, said variable power means being adaptable to permit controlled selection of a predetermined amount of force that can be resisted and successfully overridden whenever too much pain or discomfort is experienced so as to achieve the desired physical therapy effect at the joint.

4,089,331

SURGICAL DRAPE WITH FENESTRATION LINER

Edward G. Hartigan, Acton, Mass., and Donald Patience, Barrington, Ill., assignors to The Kendall Company, Boston, Mass.

Filed Dec. 6, 1976, Ser. No. 747,583
Int. Cl.² A61B *19/06*
U.S. Cl. 128—132 D **11 Claims**



1. A surgical drape comprising, a sheet of flexible material resistant to the passage of bacteria for covering a portion of a patient's body, with the covering sheet having a fenestration for placement over a surgical site, and said drape having an auxiliary sheet of flexible material resistant to the passage of body fluids and bacteria connected to the drape and extending a sufficient distance past an edge of the fenestration for placement of an end portion in a surgical incision to isolate the surgical site and control runoff of fluids, said drape including a pocket member having an opening facing toward said fenestra-

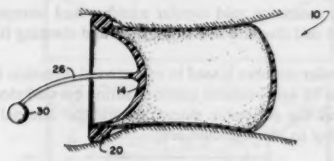
tion edge, with the end portion of said auxiliary sheet being selectively positioned in the pocket member.

4,089,332

PNEUMATIC SHAPING EAR PLUG

Leo J. Rose, 11560 Shadbust Ct., Reston, Va. 22091

Filed Aug. 9, 1976, Ser. No. 713,018
Int. Cl.² A61F *11/00*
U.S. Cl. 128—152 **1 Claim**



1. A new and improved pneumatically shaped-conforming ear plug and the like comprising an elastomeric hollow cylindrical body for being received within one's ear cavity, said cylindrical body having first and second closed ends and a finite volume of air therein and wherein the first closed end is comprised of a outwardly extending semi-spherically shaped diaphram which includes handle means mounted centrally thereon, said first and second closed ends having elastomeric consistency to perform as diaphragmatic members so that when said first closed end is depressed the second closed end is extended and vice versa, said handle means having a termination in a knob and being available to retract said first closed end when depressed to restore it to an original condition, said hollow cylindrical body possessing a ridge forming portion proximate to the first closed end and about an outer diameter of said cylindrical body for performing as a holding and guiding element for insertion within an ear, and said first closed end being essentially constructed and arranged in essentially hemispheric shape to operate as a two-state condition device.

4,089,333

METHOD OF TREATING A WOUND OR BURN

Akira Utsuo, and Katsumi Matsutomo, both of Tokyo, Japan, assignors to Nippi, Incorporated, Tokyo, Japan

Continuation-in-part of Ser. No. 594,719, Jul. 7, 1975, abandoned, which is a division of Ser. No. 399,447, Sep. 20, 1973, abandoned. This application Jun. 22, 1976, Ser. No. 698,336
Claims priority, application Japan, Oct. 28, 1972, 47-108322
Int. Cl.² A61L *15/00*
U.S. Cl. 128—156 **6 Claims**

1. A method of treating a wound or burn which comprises directly dressing the surface of the wound or burn with a non-woven fabric essentially consisting of staple fibers of spun, regenerated collagen substantially free of telopeptides.

4,089,334

PYROTECHNICALLY POWERED NEEDLELESS INJECTOR

Paul R. Schwebel, 617 Hampshire Rd., Westlake, Calif. 91361, and Manuel N. Friend, 519 Roselawn Ave., Turlock, Calif. 95380

Filed Oct. 7, 1976, Ser. No. 730,421
Int. Cl.² A61M *5/30*
U.S. Cl. 128—173 H **8 Claims**

1. A pyrotechnically powered needleless injector for introducing a predetermined quantity of medicament interstitially through the skin, comprising:

an elongated disposable ampul containing a quantity of a selected medicament and having an orifice at one end, a deflagatory gas-generating pyrotechnic charge at its other end, and a gas-operated piston positioned between said charge and said medicament to eject said medicament through said orifice under high pressure upon detonation of said charge;

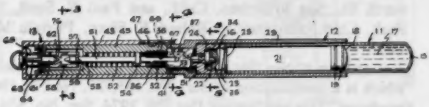
an elongated barrel open at one end to receive said ampul and having ampul-engaging means therein releasably securing said ampul in said barrel with the end of said ampul containing said charge being remote from the open end thereof;

a first sleeve secured to the end of said barrel remote from the open end of said barrel;

an elongated housing slidably mounted to said first sleeve for axial motion thereon;

motion-limiting means preventing said housing from rotating about said first sleeve;

firing pin means supported in said first sleeve for axial movement of one end thereof into charge-detonating contact with said ampul;



first resilient means operatively mounted between said first sleeve and said firing pin, urging said firing pin toward said charge;

a second sleeve secured to said barrel and having a cam formed thereon;

a cam follower secured to said firing pin and positioned to ride said cam;

retaining means effectively preventing said firing pin from rotating within said first sleeve, whereby rotation of said barrel in a first direction with respected to said housing moves said firing pin from a rest position to a cocked position more distant from said charge, wherein said first resilient means is compressed;

restraining means mounted to said first sleeve engaging and releasably securing said firing pin in said cocked position; and

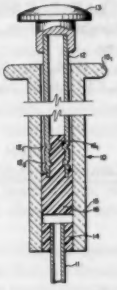
triggering means mounted to said housing disengaging said restraining means from said firing pin in response to axial movement of said housing with respect to said barrel.

4,089,335

MICROSYRINGE

Rano J. Harris, 1945 Carolyn Sue Dr., Baton Rouge, La. 70815

Filed Nov. 11, 1976, Ser. No. 740,821
Int. Cl.² A61M *5/00*
U.S. Cl. 128—218 P **10 Claims**



1. A microsyringe for use in the withdrawal and delivery of accurately measured quantities of a fluid specimen which comprises a barrel provided with an axial bore, a hollow nee-

dle affixed to the forward outlet end of the barrel, a plunger slidably mounted in the bore at the opposite end of the barrel, the forward end of said plunger being hollow and provided with a fixed seal of cylindrical shape constituted in part of a resilient material of external diameter substantially equal to the internal diameter of the bore which ranges up to about 0.062 inch, and in part of a shank of relatively smaller diameter of equal or greater length than the external diameter of the larger diameter portion of said seal which is extended into the hollow forward portion of the plunger, fitted tightly over its entire length, and retained therein by an inward thrust of the wall of the plunger which pinches against the shank to hold the seal firmly in place, and in proper alignment.

4,089,336

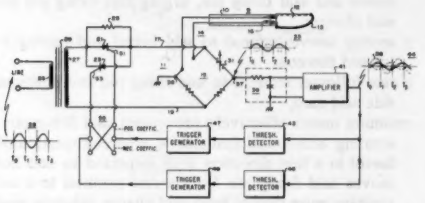
ELECTRICALLY HEATED SURGICAL CUTTING INSTRUMENT AND METHOD OF USING THE SAME

John M. Cage, Los Altos, Calif.; Robert F. Shaw, 2316 Heavenworth St., San Francisco, Calif., and Paul E. Stoft, Menlo Park, Calif., assignors to Robert F. Shaw, Portola Valley, Calif.

Continuation of Ser. No. 63,645, Aug. 13, 1970, abandoned, which is a continuation of Ser. No. 681,737, Nov. 9, 1967, abandoned. This application Dec. 20, 1974, Ser. No. 534,756

Int. Cl.[2] A61B *17/32*; A61N *3/00*

U.S. Cl. 128—303.1 **8 Claims**



5. A hemostatic cutting device comprising:

a blade means supportable on a handle;

electrically conductive heating means disposed along an edge of the blade means which forms the tissue-cutting edge thereof, said electrically conductive means having a negative temperature coefficient of resistance within a predetermined temperature range for selectively increasing power dissipation within regions along the length of the electrically conductive means that are selectively cooled.

4,089,337

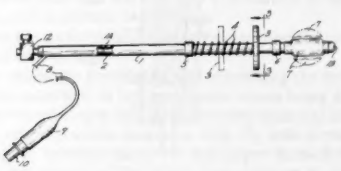
UTERINE CATHETER AND MANIPULATOR WITH INFLATABLE SEAL

Richard F. Kronner, Roseburg, Oreg., assignor to James H. Harris, Roseburg, Oreg.

Filed Dec. 1, 1976, Ser. No. 746,418

Int. Cl.[2] A61M *25/00*

U.S. Cl. 128—348 **5 Claims**



1. A catheter for insertion into the uterus for sealing same during examination, said catheter comprising,

a semi-rigid tubular member for uterine insertion through which fluid may be injected, stop means secured to said tubular member for coaction with a resilient member,

an inflatable sleeve adjacent the insertable end of said tubular member for inflated engagement with the internal uterine opening,

an air line extending along said tubular member and in communication with said inflatable sleeve for inflating same,

a disc slidably disposed on the tubular member for uninterrupted limited movement therealong and adapted for initial manually urged abutment with the end of the uterus cervix,

resilient means on said tubular member and interposed between said disc and said stop means and abutting the latter, and

said tubular member biased in an outward direction from the uterus by said resilient member acting on said stop means to seat the inflatable sleeve within the internal uterine opening to effect a fluid seal.

4,089,338

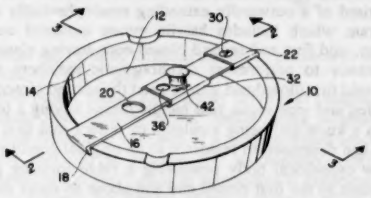
CIGARETTE FLICKER

Peter C. Roth, 790 Harem Ave., Opa Locka, Fla. 33054

Filed Oct. 13, 1976, Ser. No. 732,087

Int. Cl.[2] A24F *13/20*

U.S. Cl. 131—237 **7 Claims**



1. An appliance for use in combination with a cigarette or cigar for removing the lighted end thereof, comprising a generally flat first member having at least one downwardly turned flange portion at one end thereof, said first member defining a first aperture therein for receiving a cigarette or cigar, said first member having a pre-determined external diameter, a second member, said second member having a substantially centrally disposed recess of a pre-determined internal diameter larger than said external diameter of said first member and adapted to slide thereacross, a third member having at least one open end, a central cavity therein communicating with said open end, said cavity having an internal diameter greater than said external diameter and a downwardly turned flange at the opposite end thereof, said third member adapted to telescopically engage said first member, said second member including means thereon for contacting said cigarette or cigar and removing the lighted end therefrom.

4,089,339

SOLVENT CLEANING SYSTEM

Kenneth G. Boynton, Milford, N.H., assignor to Hollis Engineering, Inc., Nashua, N.H.

Division of Ser. No. 505,317, Sep. 12, 1974, Pat. No. 3,968,013. This application Nov. 10, 1975, Ser. No. 630,280

Int. Cl.[2] B08B *3/04*

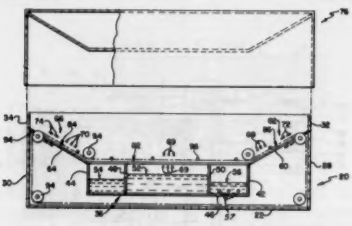
U.S. Cl. 134—73 **8 Claims**

1. In a system for cleaning work pieces with an organic solvent, and having a tank for containing a liquid body of said solvent, means disposed in said tank for heating at least a portion of said solvent to a predetermined temperature whereby to generate a quantity of solvent vapor above said tank, and means disposed above said tank for limiting the level of solvent vapor above said tank, the improvement comprising:

means for moving said work pieces in and out of said body of solvent and said solvent vapor and comprising

an array of substantially parallel, spaced, elongated members each having a central portion depressed with respect to its end portions, said elongated members extending through and between said end portions, at least one intermediate section rigidly joining said elongated members so as to preserve the parallel relationship of said elongated members, means for supporting said array in a fixed position relative to said tank and frame so that said central portion of said array is located so as to be below the surface of said body of solvent and said end portions thereof are disposed to be above said body of solvent; said work pieces being supported soley by said array of parrallel members and

drive means for sliding said work pieces on and across the top surface of said array in the direction of elongation of said members.



4,089,340

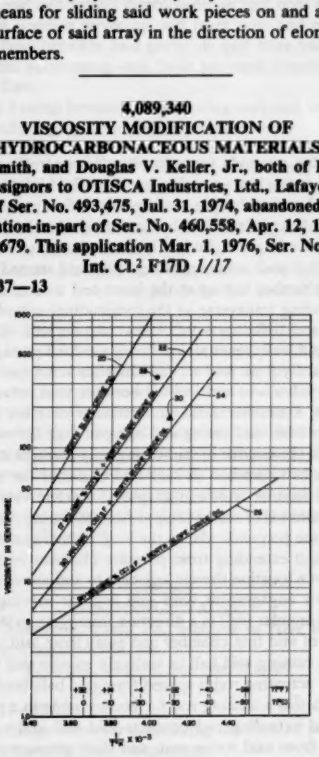
VISCOSITY MODIFICATION OF HYDROCARBONACEOUS MATERIALS

Clay D. Smith, and Douglas V. Keller, Jr., both of Lafayette, N.Y., assignors to OTISCA Industries, Ltd., Lafayette, N.Y.

Division of Ser. No. 493,475, Jul. 31, 1974, abandoned, which is a continuation-in-part of Ser. No. 460,558, Apr. 12, 1974, Pat. No. 3,941,679. This application Mar. 1, 1976, Ser. No. 662,979

Int. Cl.² F17D *1/17*

U.S. Cl. 137—13 **6 Claims**



1. A method of transporting a hydrocarbonaceous material which comprises the steps of: first mixing a viscosity modifier which is a lower chlorofluoro or fluoro alkane having a freezing point not higher than 100° F or a mixture of such alkane derivatives with said material; then effecting a flow of the resulting mixure from the first to the second of two locations; and recovering the viscosity modifier from the mixture after the mixture has reached the second of said locations.

4,089,341

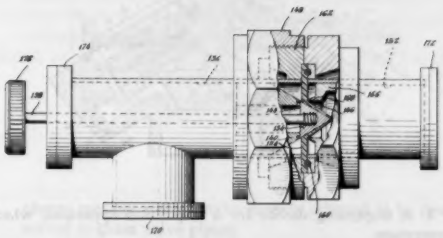
CONNECTOR METHOD AND APPARATUS FOR COUPLING TWO SYSTEMS TOGETHER WHILE EXCLUDING THE ENVIRONMENT FROM THE SYSTEM INTERIORS

Akira Okaya, New Canaan, Conn., assignor to G. Kendall Parmelee, Riverside, Conn.

Filed Jan. 8, 1975, Ser. No. 539,400

Int. Cl.² F16K *17/40*

U.S. Cl. 137—68 R **23 Claims**



1. An environment expelling and excluding connector for coupling two systems for example, vessels such as pipes, conduits, chambers, tanks, or the like, together in a coupling region to provide intercommunication therebetween while expelling the environment from the coupling region and excluding the environment from the system interiors during and after the coupling operation, said connector comprising:

a male connector element coupled to a first system defining a first conduit which communicates with the first system interior;

said first conduit having a mouth;

said male connector element having a nonplanar sealing surface for sealing the mouth of said first conduit when the systems are uncoupled, said sealing surface forming at least one apex;

a female connector element coupled to a second system defining a second conduit which communicates with the second system interior;

said second conduit having a mouth;

said female connector element having a sealing surface for sealing the mouth of said second conduit when the systems are uncoupled;

at least one of said male or female connector sealing surfaces being deformable;

said female connector sealing surface being adapted to engage said male connector sealing surface initially at said male connector apex and subsequently upon progressive deformation of the deformable sealing surface, at a progressively larger contact area about the male connector apex for thereby expelling and excluding the environment from this contact area until the contact area between said sealing surfaces extends completely across the mouths of both conduits for completely excluding the environment from the coupling region;

said connector joining the conduits together in sealed relationship after said contact area between said sealing surfaces has extended completely across the mouths of both conduits; and

valve means for providing an opening communicating between said conduits through the coupling region after said conduits have been joined together in said sealed relationship,

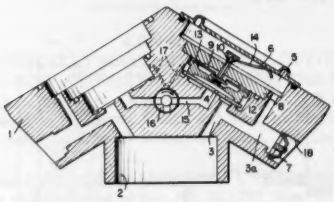
whereby the system interiors are placed in intercommunication through said connector while excluding the environment from the system interiors during and after the coupling operation.

4,089,342

DISPENSING DEVICE FOR RESPIRATION APPARATUS HAVING ONE OR MORE FLOATING VALVES OPERATING ACCORDING TO AN IMPROVED SYSTEM WITH PIVOTS FREE FROM MECHANICAL CONNECTIONS

Giuseppe Stradella; Umberto Stradella, both of 13, Via Roma; Giuliano Daniele, 144D, Via Roma, and Fernando Gatti, 37, Via Cavour, all of Recco (Genova), Italy

Filed Aug. 8, 1975, Ser. No. 602,980
Claims priority, application Italy, Aug. 9, 1974, 12928 A/74
Int. Cl.[2] A62B 7/04
U.S. Cl. 137—102 3 Claims



1. A dispensing device for a respiration apparatus, which comprises:

(a) a compressed gas inlet means for connection to a source of compressed gas, a compressed gas outlet means for delivering compressed gas to a person and an expiration outlet means for exhausting gas during expiration thereof; and

(b) control valve means for controlling the flow of compressed gas in response to the respiration of the user, comprising:

(i) a first chamber, a blind supply diaphragm in said first chamber reciprocably movable between a normally closed position and an open position, an annular wall means enclosing said chamber and having an irregular engagement surface and an annular washer means in abutting engagement with said wall means engagment surface, said abutting wall means and washer means providing a labyrinth-like passage for seepage therethrough of said compressed gas from said gas inlet means into said chamber, the pressure of said seeped compressed gas acting upon one side of the supply diaphragm; first conduit means leading from said gas inlet to the other side of the supply diaphragm; second conduit means leading from said other side of the supply diaphragm to said gas outlet; said supply diaphragm being operable to establish communication between said first and second conduit means when moved to the open position and to cut off such communication when in said closed position; and an outlet in said first chamber; and

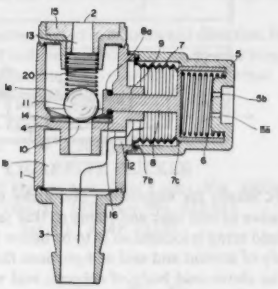
(ii) a second chamber having an inlet and an outlet, third conduit means for establishing communication between said first chamber outlet and said second chamber inlet; service valve means for controlling flow of gas through said third conduit means and having an operating arm urged by spring force to a first position in which said service valve closes said third conduit, said operating arm being reciprocably movable between said first position and a second position in which said service valve means opens said third conduit means, and a control diaphragm in contact with said operating arm; and a fourth conduit means for establishing communication between said second chamber outlet and said compressed gas outlet means and said expiration outlet means, said control diaphragm being operable to move said operating arm against the spring force to the second position whenever the user of the device inhales compressed gas through said gas outlet means.

4,089,343

AUTOMATIC FLOW CONTROL VALVE ASSEMBLY

Mitsuo Ishida, Tokyo, Japan, assignor to Giken Co., Ltd., Tokyo, Japan

Filed Jul. 1, 1976, Ser. No. 701,627
Int. Cl.[2] F16K 31/12
U.S. Cl. 137—484.8 9 Claims

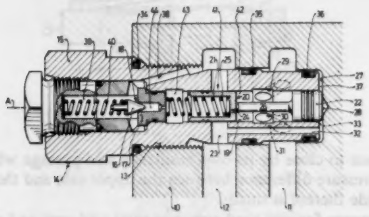


1. A valve assembly for automatically controlling the flow of a fluid, comprising: a casing having a fluid inlet and a fluid outlet, said casing having wall means defining an elongated laterally enlarged first chamber, a second chamber and a first passage extending longitudinally from the inner end of said first chamber and communicating with said second chamber, said first chamber having at the inner end thereof an annular wall extending transverse to the longitudinal axis of said first chamber and defining a valve seat at one end of said first passage, said wall means also defining a second passage extending sidewardly from said second chamber at a location spaced from said valve seat and located between said valve seat and said outlet; a member defining a pressure chamber extending sidewardly from said casing and being in fluid flow communication with the interior of said casing only through said second passage; a ball disposed in said first chamber for movement along said annular wall and adapted for selectively sealingly engaging said valve seat; a reciprocable actuating rod movable in a direction perpendicular to the longitudinal axis of said first chamber and extending from pressure chamber into said first chamber at a location therein adjacent to and above said annular wall for engagement with said ball for moving said ball along said annular wall in a direction transverse to the longitudinal axis of said first chamber and away from said valve seat; means for causing said ball to sealingly engage said valve seat when said actuating rod is spaced from said ball; biasing means coupled to said actuating rod for biasing same to a position in which said actuating rod contacts said ball and said ball is displaced from said valve seat; and fluid pressure-responsive means in said pressure chamber responsive to fluid pressure supplied through said second passage for overcoming said biasing means to position said actuating rod out of contact with said ball whereby to permit said ball to move into sealing engagement with said valve seat when fluid pressure builds up in said second chamber sufficient to overcome said biasing means.

4,089,344
TWO-WAY PRESSURE-CONTROL VALVE

Heinz Flaschar, Asperg; Heinz Kleinschmidt, Ditzingen; Peter Kroll, Gemmrigheim, and Günter Fischer, Freiberg, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Mar. 25, 1977, Ser. No. 781,458
Claims priority, application Germany, Apr. 13, 1976, 2616251
Int. Cl.² F16K *17/18*
U.S. Cl. 137—491 **10 Claims**



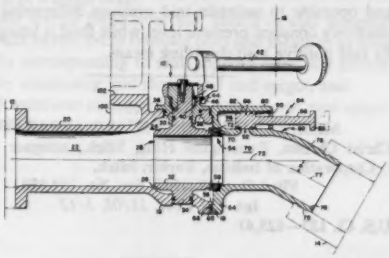
1. A two-way pressure-control valve comprising:
a housing formed with an axially extending bore having a front end and a rear end and with respective axially spaced front and rear ports opening into said bore;
a valve body in said bore between said rear port and said front end and axially displaceable in said bore between a closed position covering said front port and preventing fluid flow between said ports via said bore and an open position uncovering said front port and permitting such fluid flow;
a spring braced between said housing and said valve body normally urging same toward said rear end;
a piston axially displaceable in said bore between said rear port and said rear end and engageable axially with said valve body, said valve body defining in said bore with said front end a front compartment and with said piston a middle compartment, said piston forming with said rear end a rear compartment;
means including a fluid-flow restriction between said rear port and said front compartment for limited fluid flow therebetween;
means including a pilot valve between said front compartment and said front port for opening up said front compartment into said front port when the pressure in said front compartment exceeds the pressure in said front port by a predetermined pressure differential; and
means including a passage connecting said front port with said rear compartment for displacing said piston into engagement with said valve body and displacing same into said open position when the pressure at said front port exceeds the pressure at said rear port by a predetermined pressure differential.

4,089,345
DISCHARGE VALVE

H. Alfred Eberhardt, Paoli, Pa., assignor to Hale Fire Pump Company, Conshohocken, Pa.

Filed Sep. 8, 1976, Ser. No. 721,459
Int. Cl. F16k *11/00*
U.S. Cl. 137—596.2 **13 Claims**

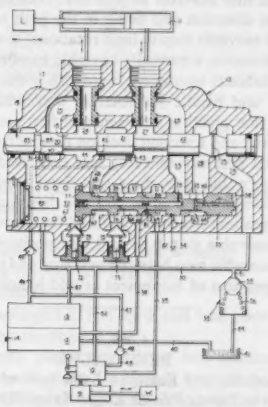
9. A discharge valve for controlling the flow of water from a fire pump to a fire hose comprising:
a valve body of a one-piece construction having a portion forming an inlet waterway for the delivery of water from the discharge of the fire pump,
means forming an outlet from said valve body,
said valve body defining a valve chamber at the downstream end of said inlet waterway,
a valve member rotatable within said valve chamber to control the flow of water through said valve body from said inlet waterway to said outlet,
and a valve cover of a one-piece construction having a portion forming a discharge passage for the flow of water from said outlet to a fire hose connected to said valve cover,
means fixedly mounting said valve cover on said valve body,
said valve cover having an integral drain valve portion forming an inlet passage communicating with said discharge passage and an outlet passage adapted to be connected to drain valve piping,
and including a drain valve member movable to open and close flow between said inlet and outlet passages of said drain valve,
said drain valve member having an operating member adapted to be manually operated from the exterior of said valve cover independently of said first-mentioned valve member.



4,089,346
LOAD RESPONSIVE FLUID CONTROL VALVES

Tadeusz Budzich, 80 Murwood Dr., Moreland Hills, Ohio 44022

Continuation-in-part of Ser. No. 709,205, Jul. 27, 1976, Ser. No. 522,324, Nov. 8, 1974, Pat. No. 3,998,134, and Ser. No. 655,561, Feb. 5, 1976. This application Dec. 13, 1976, Ser. No. 750,250
The portion of the term of this patent subsequent to Oct. 12, 1993, has been disclaimed.
Int. Cl.² F15B *13/08*
U.S. Cl. 137—596.13 **14 Claims**



1. A valve assembly comprising a housing having a fluid inlet chamber connected to a source of fluid pressure, a fluid supply chamber, first and second load chambers, a fluid outlet chamber, and fluid exhaust means connected to reservoir means, first valve means for selectively interconnecting said fluid load chambers with said fluid supply chamber and said

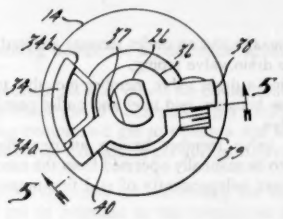
fluid outlet chamber, said first valve means having a variable orifice means between said fluid outlet chamber and said fluid exhaust means, load check valve means interconnecting for one way fluid flow said fluid supply chamber with said fluid inlet chamber, and second valve means having positive load throttling means and isolating means between said fluid inlet chamber and said fluid supply chamber, and fluid replenishing means between said fluid supply chamber and said fluid exhaust means, said second valve means having means responsive to pressure differential acting across said variable orifice means and operable to maintain said pressure differential at a first relatively constant pressure level while fluid is being throttled by said positive load throttling means.

4,089,347

MIXING VALVE ANTI-SCALD APPARATUS

Christ Christo, Farmington Hills, Mich., assignor to Masco Corporation of Indiana, Taylor, Mich.

Filed Dec. 27, 1976, Ser. No. 754,850
Int. Cl.[2] F16K *11/08, 5/12*
U.S. Cl. 137—625.41 **11 Claims**



1. Anti-scald apparatus for a mixing valve having a valve body connectable to sources of hot and cold water and a water output conduit, a rotatable valve operating stem protruding from said valve body and valve means within said valve body connected for movement with said stem to vary the proportions of hot and cold water passing through said mixing valve upon rotation of said stem, said apparatus including a fixed stop secured to said valve body proximate said stem, spaced apart first and second movable stops secured to said stem for rotation therewith, said fixed stop being located in the path of movement of said first movable stop to limit rotational stem movement in one direction and being in the path of movement of said second movable stop to limit rotational stem movement in the other direction, a manually operable handle secured to said stem for rotational movement therewith, a third movable stop carried by said handle for rotation therewith and movable between a first position between said first movable stop and said fixed stop and a second position remote from the location between said first movable stop and said fixed stop, whereby said third movable stop abuts said fixed stop and precludes rotational stem movement in said one direction prior to abutment between said fixed stop and said first movable stop when said third movable stop is in said first position, movement of said third movable stop between said first and second positions being independent of movement of said handle.

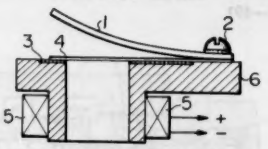
4,089,348

REED VALVE

Toshiro Yoshida, and Katsujiro Sato, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jul. 2, 1976, Ser. No. 702,237
Claims priority, application Japan, Apr. 6, 1976, 51-37773
Int. Cl.[2] F16K *15/14*
U.S. Cl. 137—856 **1 Claim**

1. A reed valve comprising:
a valve body having a passage for gas;
a valve seat made of sealing material arranged on the upper surface of said valve body;
a hollow projection aligned with said passage, located on the underside of said valve body and made of magnetic material;
a reed made of resilient magnetic material with one end secured to said valve body by a screw while the other end is freely movable, the reed being arranged on said valve



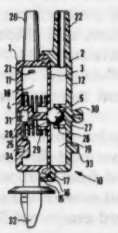
seat to close by its own resilience said passage when the pressure difference between the upper side and the lower side thereof is small;
a stopper for said reed arranged over said reed and secured to said valve body by said screw; and
a solenoid arranged around said projection for magnetizing said reed, so as to close the valve with certainty and prevent undesirable and unintentional opening of the valve.

4,089,349

MEMBRANE VALVE

Bernd Schenk, Hamburg, Germany, assignor to ITW-Ateco G.m.b.H., Norderstedt, Germany

Filed Nov. 4, 1976, Ser. No. 732,575
Claims priority, application Germany, Oct. 17, 1975, 2546488
Int. Cl.[2] F16K *7/12*
U.S. Cl. 137—859 **13 Claims**



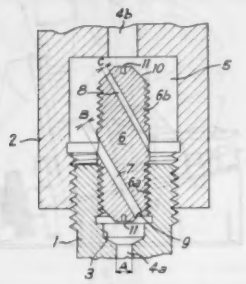
1. A membrane valve having an elastic membrane element arranged in a valve housing and cooperating with a valve seat for the selective separation of two chambers in the valve housing, said two chambers each being provided with at least one fluid connection, characterized in that the membrane element (3) is provided with a centrally disposed opening (25) a valve seat element (5) retained in the valve housing (10) with said seat element being capable of limited movement and adapted to be brought into seating engagement with the edge of said membrane opening (25), said membrane opening (25) is of a circular shape and said valve seat element is a ball that is supported for limited floating relationship relative to said membrane opening in such a fashion that during the opening of the valve or after the opening of the valve said valve seat element is maintained coaxially with respect to said membrane opening (25), a limiting element (28) positioned on the side of said membrane (3) facing away from said valve seat element (5) and extending coaxially in a direction towards and relative to said membrane opening, said limiting element adapted to extend through said opening and limit the movement of said valve seat element (5) in a direction towards said membrane opening (25).

4,089,350

DEVICE FOR ADAPTING THE RATE OF FLOW OF AN AUTOMATIC DRINKING BOWL

Jean Pierre R. Gustin, Charleville Mezieres, France, assignor to Societe Anonyme dite: La Buvette, France

Filed Dec. 27, 1976, Ser. No. 754,902
Claims priority, application France, Jan. 9, 1976, 76 00391
Int. Cl.[2] F15D 1/02; A01K 7/00
U.S. Cl. 138—45 A 4 Claims



1. A device for adapting the rate of flow of an automatic drinking bowl as a function of the pressure prevailing in the supply pipe of the installation to which it is connected, said device comprising:

a union member being connected in said supply pipe, said member having an upstream connection and a downstream connection to said supply pipe, said member being formed with an internal chamber communicating with said upstream connection and communicating with said downstream connection through a threaded opening: and

a cylindrical part threaded at its two ends, said threaded ends being separated by a median non-threaded zone, said part being formed with two internal diagonal channels of different diameters, one end of the first channel opening at one end of said part, the other end of said first channel opening at said median zone, one end of the second channel opening at the other end of said part, the other end of said second channel opening at said median zone, said part being selectively reversibly threaded in said threaded opening in said union member, said median zone constituting an abutment for the engagement of the mating threads of said part and said opening;

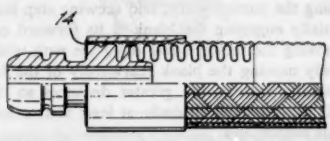
whereby communication between said upstream and downstream connections is established through that one of said channels opening at the end of said part engaged with said threaded opening.

4,089,351

FLEXIBLE METAL HOSE UNIT

Edward Anthony Ward, Leighton Buzzard, and Leslie Charles Barron, Hemel Hempstead, both of England, assignors to Avica Equipment Limited, Hemel Hempstead, England

Filed Mar. 5, 1976, Ser. No. 663,581
Claims priority, application United Kingdom, Mar. 7, 1975, 9627/75
Int. Cl.[2] F16L 11/11, 11/14
U.S. Cl. 138—109 3 Claims



1. A flexible metal hose unit comprising

a spigot formed with an annular flange and an annular gripping area, said flange and said gripping area being coaxial with the axis of said spigot,

a corrugated flexible inner metal tube fitted over said spigot adjacent said flange,

a first weldment connecting said flange and said metal tube in sealing relation one with the other, said weldment thereby connecting said spigot and said metal tube,

at least one flexible sheath surrounding said metal tube and at one end fitted over said gripping area, said sheath being formed of a metal braid,

an annular ferrule fitted over said sheath in said gripping area, said ferrule being crimped onto said sheath in an area radially corresponding to said gripping area, said ferrule thereby connecting said sheath and said spigot, and

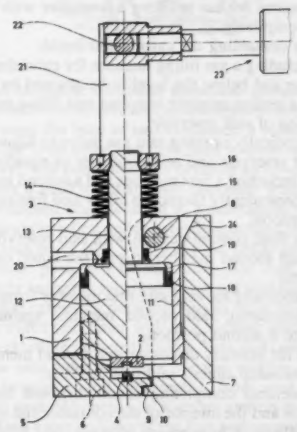
a second weldment connecting said metal sheath, said spigot and said ferrule one with the other.

4,089,352

APPARATUS FOR POSITIVELY CONNECTING TWO OVERLAPPING BAND PORTIONS

Wenzel Synek, Oberengstringen, Switzerland, assignor to FROMM AG, Spreitenbach, Switzerland

Filed Feb. 22, 1977, Ser. No. 771,033
Int. Cl.[2] B21F 9/02
U.S. Cl. 140—93.2 6 Claims



1. An apparatus for interconnecting two overlapping band portions, comprising:

a housing;

a first tool movably mounted at said housing;

drive means for driving said first tool;

a base plate member;

a second tool arranged to rest upon said base plate member;

a counter holder member;

means for fixedly connecting one of said members at the region of one side thereof with said housing;

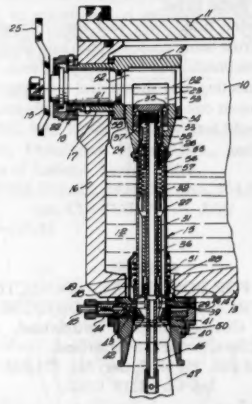
means for releasably connecting the base plate member with the counter-holder member at a side of said one member opposite the side where said one member is rigidly connected with said housing; and

means for pivotably connecting the other of said members with said housing to enable said counter-holder member and base plate member to be brought into and out of engagement with one another.

4,089,353
FILLING VALVE FOR CARBONATED LIQUID BOTTLING MACHINES

Mario Eduardo Antonelli, Buenos Aires, Argentina, assignor to Crown Cork & Seal Company, Inc., Philadelphia, Pa.

Continuation of Ser. No. 583,652, Jun. 4, 1975, abandoned. This application Oct. 13, 1976, Ser. No. 732,049
Int. Cl.[2] B65B *3/04*; B67C *3/04*
U.S. Cl. 141—302 10 Claims



1. Filling apparatus for use in filling a container with a carbonated liquid comprising:

a reservoir for containing the carbonated liquid;

a gas valve including a gas filling member for extending into the container and below the level to be attained by liquid therein and a sealing member coupling said filling member to the interior of said reservoir;

means for periodically opening said gas valve to allow pressures in said reservoir and said container to equalize;

a liquid valve including a first member and a second member movable independently thereof to allow said first member to seat thereupon;

a valve seat in fluid communication with said reservoir and receiving said second member to prevent liquid outflow therebetween;

means for periodically moving said first member from a first position encapturing said second member against said valve seat, to a second position;

biasing means for biasedly disposing said second member in sealing relationship against said first member;

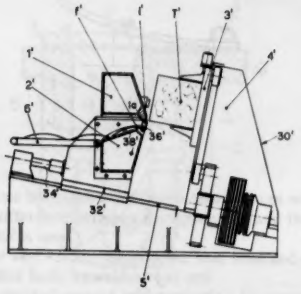
said second member comprising means disposed between said reservoir and the interior of the container and responsive to a difference in pressure between said liquid and said container interior to displace said second member away from said first member to allow a flow of liquid therebetween.

4,089,354
WOOD SHEARING MACHINE

Angelo Cremona, V.le Lombardia, 275, Monza, Italy (20052)

Filed May 17, 1976, Ser. No. 686,679
Claims priority, application Italy, May 28, 1975, 23802 A/75
Int. Cl.[2] B27L *5/08*
U.S. Cl. 144—178 6 Claims

1. A wood shearing machine comprising a machine base, a wood stock holder, first slide means mounting said wood stock holder on said base for movement in upward and downward directions, blade means, blade holder means for mounting said blade means, said blade being mounted obliquely on said blade holder means and having a cutting edge pointing toward said first slide means and projecting outwardly from said holder, second slide means mounting said blade holder means on said base for movement in backward and forward directions at substantially right angles to said woodstock holder for advancing and retracting said blade means in respect to said wood stock holder, said blade holder means with said blade means being anchorable in a fixed location in respect to the movement of said wood stock holder so that said wood stock holder effects the cutting of a strip from a wood stock held by said holder when the wood stock is advanced upwardly within the

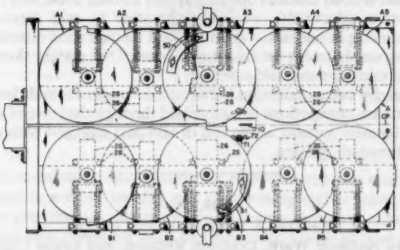


range of the projecting blade, said blade holder means mounting said blade means being shaped in a generally upward arc deflecting the strip into an upwardly curved arc, and conveyor means disposed adjacent to said blade means and said blade holder means supporting said strip at its edges with said strip being curved upwardly between the edges for feeding away from said blade.

4,089,355
AUTOMATIC RESAW SHAKE CUTTER AND METHOD

Gerhard G. Dueck, Suite 306-1635 West 12th, Vancouver, B.C., Canada

Filed Apr. 4, 1977, Ser. No. 784,241
Int. Cl.[2] B27M *1/08, 3/02*; B27C *1/00*
U.S. Cl. 144—309 R 23 Claims



1. A method of sawing shakes from blanks to maximize yield comprising:

advancing a blank having first and second opposite side faces endwise along a path;

moving a cutting blade through a cutting plane lying in said path;

skewing the blank laterally as it moves along the path prior to passing the cutting plane, said skewing step including sequentially engaging the blank at its forward end and then moving the forward end along the path while progressively moving the blank rearwardly of the forward end laterally increasingly greater distances so that the blank is moved simultaneously at least at two locations along its length; and

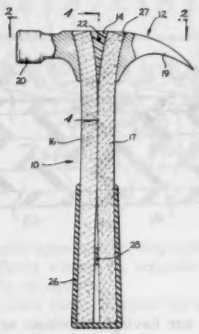
continuing to move the skewed blank through the cutting plane to sever the blank into two separate shakes.

4,089,356

FIBER-REINFORCED PLASTIC TOOL HANDLE

Dennis J. O'Connor, 11175 Houston St. Apt. #1, North Hollywood, Calif. 91601

Filed Feb. 6, 1976, Ser. No. 655,862
Int. Cl.[2] B25G 3/10
U.S. Cl. 145—29 R 11 Claims



1. In a tool having a tool head with a handle receiving aperture, an improved handle for engaging said aperture comprising:

a plurality of separate, elongated, solid plastic members having reinforcing fibers uniformly distributed therein, each of said members having an upper tool engaging end, a lower butt end and a central portion merging with said upper and lower ends, said upper tool receiving end of said members being disposed within said tool head aperture;

locking means disposed on said upper tool receiving ends of said members for securing each of said members upper end to said tool head;

said central portion of each member being in confronting non-fixed relationship to each other;

grip means disposed on said lower butt end of each of said members for providing a grip and for securing said butt ends;

spacer means frictionally positioned between said members below said tool head for reducing vibration during use;

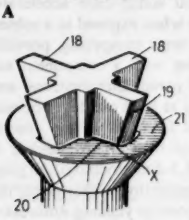
whereby a plurality of members may be readily secured within said aperture of said tool.

4,089,357

THREADED FASTENER

Peter John Gill, Wolverhampton, England, assignor to G.K.N. Fasteners Limited, England

Filed Jul. 16, 1976, Ser. No. 706,035
Claims priority, application United Kingdom, Jul. 19, 1975, 30366/75
Int. Cl.[2] F16B 23/00
U.S. Cl. 145—50 A 5 Claims



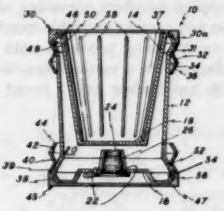
1. A screw for reducing cam-out of a driver comprising an elongated threaded shank extending along a central longitudinal axis and having a head at one end, said head having an outer face with a cruciform type recess extending inwardly therefrom along said axis and terminating at a bottom wall, said recess including a central cavity having a generally square cross-section from its outer end to its bottom end and which tapers uniformly from a maximum cross-section at said outer face of the head to a minimum cross-section at said bottom wall, said recess further including four grooves radiating from the central cavity at 90° angular spacings symmetrically about said axis and each groove extending outwardly from a side of the generally square cross-section of the central cavity and terminating at an outer wall, the outer wall of each groove tapering downwardly and inwardly from said outer face to said bottom wall, and said outer walls defining a main cone angle of at least 40° and not more than 45°.

4,089,358

INFLATABLE CONTAINER

Brian Korson, 81 Ranee Avenue, Toronto, Ontario, Canada (M6A 1N1)

Filed Jan. 5, 1977, Ser. No. 756,771
Int. Cl.[2] B65D 37/00
U.S. Cl. 150—.5 4 Claims



1. An inflatable container apparatus comprising a substantially flexible outer side wall extending into bottom wall means for forming the base of said container, a substantially flexible inner side wall extending into said bottom wall means, said outer wall and said inner wall defining an envelope therein for receiving a fluid to inflate said container from a substantially fully collapsed configuration to a substantially fully extended configuration, a first collar extending around the upper periphery of said outer side wall, a second collar extending around the bottom periphery of said outer side wall, cap means for cappingly engaging said first collar and said second collar, said first collar extending outwardly away from said outer wall and then towards said outer wall in a V-cross section, said second collar extending outwardly away from said outer wall and then towards said outer wall in a V-cross section, said first collar being securable and releaseable from said second collar through said cap means, a V-cross section corresponding to each of the cross sections of the first and second collars extending around the periphery of said cap means, the apex of said first collar and the apex of said second collar being receivable by the V-cross section of said cap means, said first collar releasably securable to said second collar through said cap means when said envelope is deflated, sealable opening means extending into said envelope for inflating and deflating said container.

4,089,359

MUD AND SNOW TIRE CLEATS

Jerry J. Jones, P.O. Box 137, Conifer, Colo. 80433

Filed Mar. 3, 1977, Ser. No. 773,820
Int. Cl.[2] B60C 27/20
U.S. Cl. 152—216 5 Claims

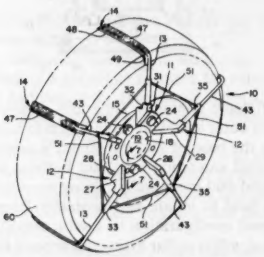
1. Mud and snow tire cleats securely mounted to the wheel of an automotive vehicle which can be easily and conveniently positioned around the treads of a tire for driving through mud or snow and which can be stored at the side of the tire when not in use, the device comprising, in combination:

a cylindrical mounting plate having a front and opposed rear surfaces, a round end surface, and a round inside surface to

form a large round opening for positioning of said mounting plate over the hub of an automotive vehicle wheel, with a series of round through holes provided at predetermined locations around the mounting plate to match the threaded studs provided on a variety of automotive vehicle wheels, with the mounting plate being secured to the vehicle wheel hub by means of a series of elongated hub nuts to affix the mounting plate a short distance outwardly from said wheel hub; and

a series of L-shaped brackets consisting of opposed side surfaces, a flat end surface, a front surface angularly disposed to said end surface, an intermediate surface disposed perpendicularly to said end surface, and front and rear surfaces projecting into an L-shaped configuration upwardly from and perpendicularly to said intermediate surface, and a top surface provided with a round hole therein extending into the L-shaped bracket from the top surface to near said intermediate surface, with said series of L-shaped brackets being securely affixed to said mounting plate so as to be spaced equidistantly around the front surface of said mounting plate and so as to be spaced between said round through holes therein; and

a series of telescoping members consisting of a cylindrical hollow member and a solid extendable member, a cylindrical hollow member being provided with an elongated through slot disposed in a vertical direction a short distance below its top surface and a round through hole



located nearly centrally along the length of the hollow member so as to be disposed 90° from said elongated through slot, said hollow member being further provided with a spring assembled therein for assembly of the extendable member thereagainst, the extendable member being provided with a spring-loaded pin a short distance upwardly from its bottom surface for locking of the extendable member into said elongated slot or through hole in said hollow member; and

a series of cleats consisting of a serrated or spike-like top surface, an opposed bottom surface slightly rounded to match the configuration of tire treads, and opposed flanges integrally conjoining said top surface and bottom surface so as to protrude downwardly therefrom and with a spacing between said flanges determined by the width of the vehicle tire, with said cleats further being securely affixed to the top of said extendable member so that when said spring-loaded pin is positioned within said elongated slot, said cleats are positioned over the tire treads, and, when said pin is positioned within said round through hole in said hollow member, said cleats are turned 90° from the position over the tire treads so as to be positioned downwardly from said tire treads and parallel to the sides of the vehicle tire; and

a series of truss rods consisting of lengths of solid cylindrical rods secured on each of their ends between said cylindrical hollow members so as to provide rigid assembly between each of said telescoping members.

4,089,360

PNEUMATIC TIRE CONTAINING AN IRRADIATED LAMINATED COMPONENT

Georg Gustav Anton Böhm, Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Sep. 22, 1975, Ser. No. 615,266
Int. Cl.² B60C *5/00*; B29H *17/08*
U.S. Cl. 152—330 R **6 Claims**

1. A pneumatic tire having a laminate as an abrasion gum strip or an innerliner wherein said laminate is comprised of at least two groups of layers with each group having at least one layer and each layer of said laminate comprising a rubber compound having an unsaturated, amorphous polymer selected from the group consisting of natural rubber and synthetic rubber and each layer having sulfur and sulfur cure accelerators so that said layers will vulcanize when exposed to a subsequent vulcanization treatment, said laminate manufactured by the steps comprising providing at least one layer of a first group with a component selected from the group consisting of paradichlorobenzene and the thioetherpolythiols; providing at least one layer of a second group with components selected from the group consisting of 2,6-di-t-butyl-p-cresol; phenyl beta-naphthylamine; 4,4′ thiobis (6-t-butyl-m-cresol); N-(1,3-dimethylbutyl) N′ phenyl-p-phenylene diamine; syn-di-betanaphthyl-p-phenylene diamine; and aromatic oils; said components yielding different degrees of cross-linkage in said layers when said layers are subjected to irradiation; assembling at least one of said layers from each said group into contiguous relationship to form a laminate; subjecting said laminate to irradiation so that at least two of said layers are cross-linked to a different degree; assembling said laminate into said tire and vulcanizing said tire.

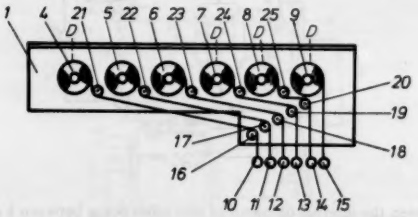
4. In the method of manufacturing a pneumatic tire having a laminate as an abasion gum strip or an innerliner wherein said laminate is comprised of at least two groups of layers with each group having at least one layer and each layer of said laminate containing a rubber compound having an unsaturated, amorphous polymer selected from the group consisting of natural rubber and synthetic rubber and each layer of said laminate containing sulfur and sulfur cure accelerators so that said layers will vulcanize when exposed to a subsequent vulcanization treatment; the steps comprising providing at least one layer of a first group with a component selected from the group consisting of paradichlorobenzene and the thioetherpolythiols; providing at least one layer of second group with components selected from the group consisting of 2,6-di-t-butyl-p-cresol; phenyl beta-naphthylamine; 4,4′ thiobis (6-t-butyl-m-cresol); N-(1,3-dimethylbutyl)-N′ phenyl-p-phenylene diamine; syn-di-betanaphthyl-p-phenylene diamine and aromatic oils; said components yielding different degrees of cross-linkage in said layers when said layers are subjected to irradiation; assembling at least one of said layers from each said group into contiguous relationship to form a laminate; subjecting said laminate to irradiation so that at least two of said layers are cross-linked to a different degree; assembling said laminate into said tire and vulcanizing said tire.

4,089,361

REEL APPARATUS FOR BACKGROUND SHEET

Heinz Zeppmeisel, 2 Bullerteichstrasse, D 4535 Westerkappeln, Germany

Filed Aug. 24, 1976, Ser. No. 717,274
Int. Cl.[2] A47H 1/00
U.S. Cl. 160—120 4 Claims



1. Backdrop display apparatus for displaying one of a plurality of backdrop sheets wound on separate backdrop supply rollers, respectively, comprising

(a) stationary bracket means adapted for connection with a fixed support;

(b) a series of parallel generally horizontally arranged backdrop supply rollers rotatably connected with said bracket means, each of said supply rollers having a backdrop sheet wound thereon:

(c) a plurality of horizontal transverse rods secured to the free ends of said backdrop sheets, respectively, thereby to serve as weights for the ends of said sheets;

(d) first guide roller means (20, 35) connected with said bracket means adjacent, parallel with, and at a lower elevation than a first end roller (9,9') of the series of backdrop supply rollers; and

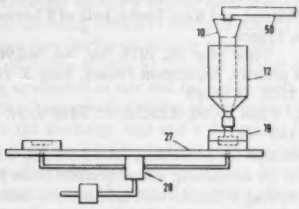
(e) second guide roller means including a plurality of second guide rollers (21–25; 121–125) associated with the remaining ones of said supply rollers, respectively, said second guide rollers being arranged to guide the backdrop sheets withdrawn from the said remaining supply rollers in spaced relation to the other supply rollers during the transport of the sheets to the said first guide means, respectively, whereby each backdrop sheet withdrawn from the said remaining supply rollers may be suspended from said first guide roller means adjacent the position at which a backdrop sheet may be suspended from said first end roller.

4,089,362

MANUFACTURE OF FOUNDRY CORES AND MOULDS

Albert Edwards, Peterborough, England, assignor to Baker Perkins Holdings Limited, Peterborough, England

Filed May 3, 1976, Ser. No. 682,470
Claims priority, application United Kingdom, May 1, 1975, 18257/75
Int. Cl.[2] B22C 9/12, 15/22
U.S. Cl. 164—7 5 Claims



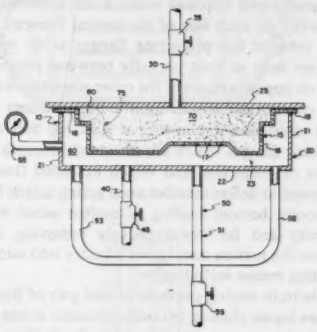
1. A method of filling a foundry mold box or core box with a sand-based cold-setting molding mixture consisting of sand mixed with a binder and a catalyst for accelerating the setting reaction between the sand and binder, said method comprising the steps of: introducing the mixture to the box by applying a gas under pressure thereto and simultaneously applying suction to the box, ceasing the application of the gas under pressure and thereby terminating filling, and thereafter continuing to apply suction to the box to accelerate chemical setting of the mixture.

4,089,363

METHOD OF MANUFACTURING SHELL CORES AND MOLDS

Andrew P. Dunlop, Riverside, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Dec. 27, 1976, Ser. No. 754,360
Int. Cl.[2] B22C 9/12
U.S. Cl. 164—16 10 Claims



1. A method of manufacturing shell cores or molds comprising the steps:

(a) charging a sand mix to a pattern, said mix comprising sand having a uniform coating of binder dispersed thereon, said binder comprising a gas curable binder, said pattern having a sand receiving portion including a shaping surface, and an opening through which the sand is charged, said sand being charged into said pattern in sufficient quantity to provide a charged sand mass which fills the pattern to said opening said shaping surface including vent means for passing gas through said pattern;

(b) providing a gas barrier at said opening of the pattern, which barrier cuts off a communication of interstitial spaces in the charged sand in the area of said opening with any other gas space;

(c) placing the charged pattern in a gassing chamber, and sealing said charged pattern therein with respect to the atmospheric environment, said pattern and said gassing chamber being so dimensioned as to provide a void space between the pattern in the region of said shaping surface and the adjacent portions of the gassing chamber and, wherein the interstitial spaces in the charged sand are in direct pneumatic communication through said vent means with the void space in the gassing chamber;

(d) providing inert gas pressure P_1 in the gassing chamber;

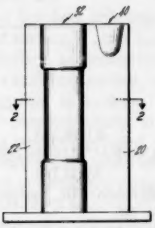
(e) charging a gas catalyst to the chamber until the pressure in the void space is P_2, the difference between P_1 and P_2 being such that the extent of penetration of the catalyst into the charged sand mass is limited, and whereby a sand shell of desired thickness is cured.

4,089,364

MOLD HAVING INTEGRAL PREFORMED GATING SYSTEM

Douglas R. Hayes, Vernon, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 22, 1976, Ser. No. 744,068
Int. Cl.[2] B22C 9/08
U.S. Cl. 164—363 4 Claims



1. In a three-part casting mold of the type having a preformed central mold element disposed in spaced relation between preformed opposed outer mold elements to define a mold cavity on each side of the central element, wherein the central element has projecting flanges at its opposite edges which are held at least partially between projecting mating flanges on opposite edges of the outer elements to maintain said spaced relation during casting, the improvement comprising:

outer mold elements having at least one pair of projecting mating flanges which are of extended length in the direction of projection and which extended flanges are preformed to define therebetween gating means for providing smooth, bottom feeding of molten metal to each mold cavity and for simultaneously removing contaminants from the molten metal prior to entry into said cavities, the gating means including:

a. bottom mating portions of said pair of flanges defining an ingate channel in communication at one end with the bottom portion of said cavities for feeding molten metal thereto, the ingate channel extending from the mold cavities in the direction of flange projection and including along its length trap means for removing contaminants from the metal as the metal flows therethrough;

b. the remaining mating portions of said pair of flanges defining an upwardly oriented sprue channel intersecting and in communication with the other end of the ingate channel for directing molten metal therein during filling, the sprue channel having a reduced cross section along its length to control metal flow, including flow rate, so as to minimize turbulence as the metal flows into the ingate channel and then into the mold cavities.

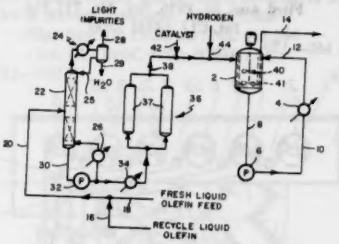
4,089,365

METHOD OF PUMP-AROUND COOLING REACTION MASS DURING POLYMERIZATION OF OLEFINS

Constantine D. Miserlis, Arlington, and Peter J. Lewis, Andover, both of Mass., assignors to The Badger Company, Cambridge, Mass.

Filed Sep. 30, 1976, Ser. No. 728,153
Int. Cl.[2] B01J 1/00
U.S. Cl. 165—1 11 Claims

1. In a method of cooling the highly viscous reaction mass of polymer dissolved in monomer during polymerization of an olefin in a reactor of a polyolefin plant by pumping by pump means the reaction mass from the reactor through the tubes of an external tubular cooler back to the reactor, the improvement comprising pumping said reaction mass through the tubes of a single pass single bank cooler as opposed to a multi-pass



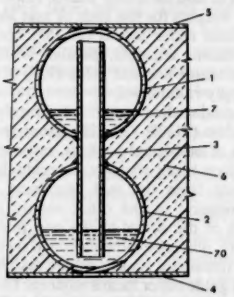
cooler, the internal diameter of said tubes being between ¼ and ¾ inch.

4,089,366

MEANS AND METHODS FOR SENDING HEAT DOWNWARDLY

Edward J. O'Hanlon, Assembly Point, Lake George, N.Y. 12845

Filed Nov. 22, 1976, Ser. No. 744,166
Int. Cl.[2] F28D 15/00
U.S. Cl. 165—1 3 Claims



1. In a means for sending heat downward, a pair of metallic containers one above the other and connected by a metallic tubular passageway, said passageway reaching almost to the inner bottom of the lower container and almost to the inner top of the upper container, one of said containers partially filled with liquid sulphur dioxide and all tubular and container contacts and connections permanently sealed and made leak proof so no sulphur dioxide fumes can possibly excape.

4,089,367

FOOD PROCESSING APPARATUS

Antoine Wietzel, and René Roche, both of 8 Impasse du Plan, La Trinite, France

Filed Mar. 28, 1975, Ser. No. 562,960
Claims priority, application France, May 3, 1974, 74 16711; Feb. 25, 1975, 75 06789
Int. Cl.[2] F25B 29/00; A23C 3/02; F16F 1/34; F28F 27/00
U.S. Cl. 165—61 6 Claims

1. Apparatus for processing food products comprising:

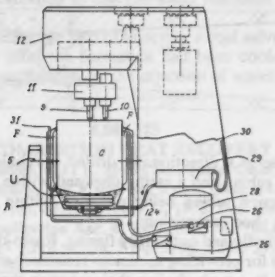
A. a vat for containing a food product to be processed, said vat having a double-wall side portion defining a cooling jacket and a double wall bottom portion defining a heating compartment;

B. a closed cycle refrigeration device external to said vat and operatively coupled to said jacket and provided with means selectively to supply a liquid cooling agent thereto

to cool the food product and means to drain said cooling agent from said jacket;

C. a heating element disposed in said compartment;

D. a reserve tank coupled to said heating compartment and means to move said reserve tank in the vertical direction relative to said compartment whereby the compartment may be filled with or drained of liquid, conduit means



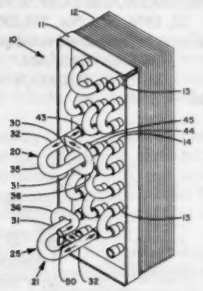
between said reserve tank and said heating compartment, said heating compartment containing a liquid heating agent which is heatable by said element and drainable into said tank through said conduit means, said jacket when drained of said cooling agent acting as a thermal insulator for said vat when said compartment contains said liquid heating agent to heat the food product.

4,089,368

FLOW DIVIDER FOR EVAPORATOR COIL

William W. Bell, Jr., Marcellus, and Rudy C. Bussjager, Minoa, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 22, 1976, Ser. No. 753,657
Int. Cl.[2] F28F *9/26*; F25B *39/02*
U.S. Cl. 165—139 **10 Claims**



1. A heat exchanger having a tubular flow divider suitable for accepting an incoming stream of fluid and equally distributing the flow into two discharge streams including

a U-shaped discharge section having two parallel discharge legs being connected at one end by a tube bend, and

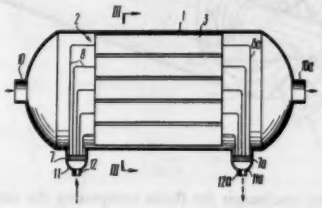
an inlet section having a straight leg that is in parallel alignment with the discharge legs and a curved leg being arranged to place the inlet leg in fluid communication with one of the discharge legs, the curved leg having a first bend arranged to turn the curved leg into a plane substantially perpendicular to the discharge legs and a second bend in said plane that has a radius of curvature sufficient to hold fluid passing therethrough in said plane whereby the fluid enters the discharge leg substantially perpendicular to the axis of said leg.

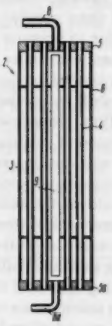
4,089,369

MODULAR HEAT EXCHANGER AND METHOD OF ITS OPERATION

Adolf Usherovich Lipets, prospekt Lenina, 150-a, kv. 38; Viktor Fedorovich Moskvichev, ulitsa Entuziastov, 10, kv. 9; Georgy Viktorovich Katyshev, ulitsa Entuziastov, 16, kv. 13; Lev Nikolaevich Artemov, ulitsa Pravdy, 24A, kv. 44; Anatoly Fedorovich Bakanov, ulitsa Ordzhonikidze, 13, kv. 40; Raisa Nikiforovna Shamarokova, Gulevsky proezd, 8/5, kv. 60; Alexei Arsentievich Dolgy, Revprospekt, 16, kv. 23; Stanislav Alexandrovich Eletsky, ulitsa Mashinostroitelei, 28, kv. 75; Yakov Natanovich Grinberg, ulitsa Entuziatsov, 3, kv. 28; Vitaly Andreevich Ardamatsky, Gulevsky proezd, 6, kv. 5; Svyatoslav Nikolaevich Vivsik, Bolnichny proezd, 3, kv. 56, all of Podolsk Moskovskoi oblasti; Vasily Evdokimovich Zavedeev, poselok Sosny, 7, kv. 75, Minsk; Ilya Julievich Zevin, ulitsa Fevralskaya, 54/150, kv. 80, Podolsk Moskovskoi oblasti, and Evgeny Alexeevich Fadeev, ulitsa Sevanskaya, 7, korpus 1, kv. 64, Moscow, all of U.S.S.R.

Filed Apr. 6, 1976, Ser. No. 674,093
Int. Cl.[2] F28F *9/02*
U.S. Cl. 165—158 **4 Claims**





1. A modular heat exchanger comprising:

a shell formed with a first inlet and a first outlet for receiving and discharging a first coolant, respectively;

a plurality of longitudinal modules connected in parallel and disposed in said shell, each of said modules having the form of a casing, said module having opposite ends;

first and second plates secured to the module ends, respectively;

a plurality of longitudinal pipes disposed in each of said modules for receiving the first coolant, each of said pipes having first and second open ends, said plates being formed with openings for receiving the tube ends, respectively, said shell being formed with a second inlet and a second outlet for receiving and discharging a second coolant, respectively, each of said modules being formed with a third inlet and a third outlet, respectively, said third inlets and outlets communicating with said second inlets and outlets, respectively;

each of said modules being formed with an intertube space for the second coolant to pass therethrough; and a plurality of longitudinal displacer elements disposed in said shell

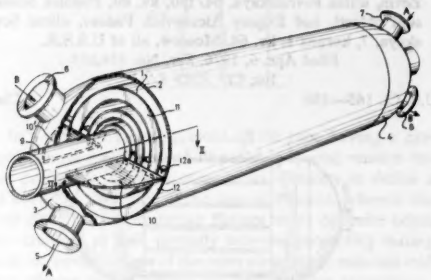
said modules having a plurality of spaces defined therebetween, respectively, said displacer elements being disposed in said spaces alongside the entire length of the modules, whereby an equality of heat exchange between said modules is obtained.

4,089,370

COMPACT HEAT-EXCHANGER FOR FLUIDS

Philippe Albert Hippolyte Marchal, Boulogne, France, assignor to Bertin & Cie, Plaisir, France

Filed Jun. 4, 1976, Ser. No. 692,917
Claims priority, application France, Jun. 5, 1975, 75 17517
Int. Cl.[2] F28F 9/02; F28D 7/10
U.S. Cl. 165—159 **5 Claims**



1. A heat exchanger for fluids comprising the combination of:

an outer cylindrical casing formed of a shell made of relatively thick metal sheet capable of withstanding the mechanical stresses due to pressure forces developed during operation of the heat exchanger,

a series of generally coaxial heat-exchange surfaces housed inside said casing shell and defining therebetween axially-extending fluid flow passageways, and heat-exchange surfaces being formed of relatively thin metal sheet incapable by itself of withstanding said mechanical stresses,

spacer means mechanically interconnecting said casing shell and surfaces to buttress the same against each other for transferring said mechanical stresses to said casing shell,

two opposite end closures respectively fitted at the opposite ends of said casing shell and defining therewith an overall enclosure containing said fluid flow passageways,

fluid inlet and outlet union means on both said end closures,

transverse partition means extending within said end closures from the axis to the periphery thereof and engaging the thin edges of said heat-exchange surfaces, to define at least two separate end manifolds communicating with said fluid flow passageways, each manifold further communicating with a respective one of said union means,

a first set of arcuate obturators plugging one end of every other fluid flow passageway at one of said end manifolds, and

a second set of arcuate obturators plugging one end of the other fluid flow passageways at another of said end manifolds,

said first and second sets of arcuate obturators being in staggered formation and defining with said fluid flow passageways, manifolds and union means at least two mutually segregated paths of said fluids in heat-exchange relationship, and

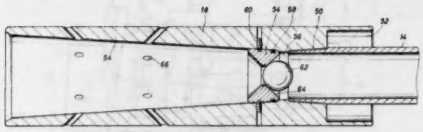
said arcuate obturators being of an excessive length with respect to the strict plugging function thereof relative to the corresponding manifold and substantially overriding said transverse partition means to extend beyond the same in the other manifold.

4,089,371

PRODUCTION SHOE

Perry J. Decuir, Sr., P.O. Box 1154, New Iberia, La. 70560

Filed Oct. 7, 1976, Ser. No. 730,596
Int. Cl.[2] E21B 17/14, 43/00
U.S. Cl. 166—242 **4 Claims**



1. For use in a directionally drilled borehole which has a production tubing and a casing disposed within said borehole, said production tubing being disposed within said casing, a well tubing shoe comprising:

a downwardly and outwardly flaring, frusto-conical internal surface for providing minimum resistance and centralizing of wireline tools during their passage through the well tubing shoe and production tubing, the lowermost end of said internal surface having rounded corners;

means for connecting the well tubing shoe to the production tubing; and

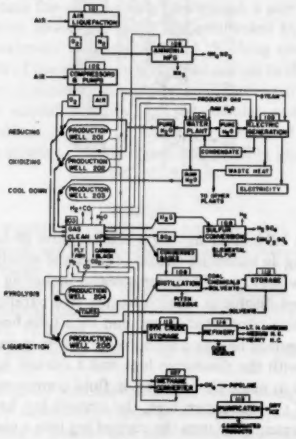
a valve for permitting fluid pressurizing of the production tubing disposed within the well tubing shoe, said valve including means for releasably securing said valve within the well tubing shoe so that upon application of excessive pressure above a predetermined limit, the valve will be forced from the well tubing shoe and will drop to the bottom of the borehole.

4,089,372

METHODS OF FLUIDIZED PRODUCTION OF COAL IN SITU

Ruel C. Terry, Denver, Colo., assignor to In Situ Technology, Inc., Denver, Colo.

Division of Ser. No. 595,335, Jul. 14, 1975. This application Nov. 23, 1976, Ser. No. 744,259
The portion of the term of this patent subsequent to Apr. 6, 1993, has been disclaimed.
Int. Cl.[2] E21B 43/24
U.S. Cl. 166—256 **7 Claims**



1. A method of producing coal in situ comprising the steps of:

drilling injection and removal wells into a coal formation,

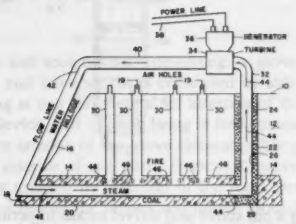
igniting the coal formation,
injecting an oxidizer into the coal formation at a rate to maintain an oxidizing environment in the coal formation,
producing carbon dioxide, sulfur dioxide and particulate matter until the coal formation is approximately half consumed, and then
injecting water into the formation to form producer gas, wherein the water is cool relative to the temperature of the coal formation so that the water functions to cool the formation,
further including the step of injecting a coal solvent into the formation after the formation had been cooled from its burning temperature by the injection of water.

4,089,373

SITU COAL COMBUSTION HEAT RECOVERY METHOD

Merrill J. Reynolds, 6111 E. Skelly Dr., Tulsa, Okla. 74135, and Ralph W. Disney, 124 E. 4th St., Tulsa, Okla. 74103

Division of Ser. No. 631,108, Nov. 12, 1975, Pat. No. 4,018,279. This application Apr. 4, 1977, Ser. No. 784,658
Int. Cl.[2] E21B *43/24*; F24J *3/00*; F28D *21/00*
U.S. Cl. 166—256 **6 Claims**



1. In a coal seam in the earth, the method of burning the coal in situ and recovering the heat of combustion, comprising:
(a) forming at least one horizontal borehole into said seam, substantially parallel to the plane of said seam, to a selected point, and inserting a first casing into said one horizontal borehole;
(b) forming from the surface at least one first vertical borehole to intersect said one horizontal borehole at said selected point, and inserting a second casing into said one first vertical borehole, and joining said first and second casings;
(c) forming a plurality of horizontally spaced second vertical boreholes from the surface into said coal seam in the area of said one horizontal borehole, and supplying air under pressure through said boreholes to said coal seam.
(d) igniting said coal in the vicinity of said air boreholes and continuously burning said coal;
(e) flowing water into said first casing, whereby said water will be converted to steam, and will flow up said second casing; and
(f) flowing said steam into a steam power utilization means.

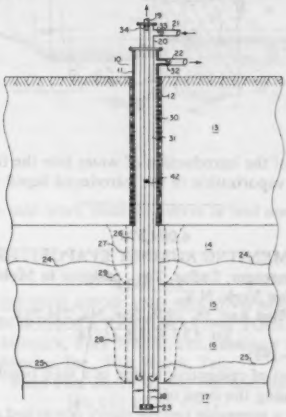
4,089,374

PRODUCING METHANE FROM COAL IN SITU

Ruel C. Terry, Denver, Colo., assignor to In Situ Technology, Inc., Denver, Colo.

Filed Dec. 16, 1976, Ser. No. 751,135
Int. Cl.[2] E21B *43/24, 43/26*
U.S. Cl. 166—259 **12 Claims**

1. A method of withdrawing methane from an underground coal deposit comprising the steps of
establishing a first communication passage between the surface of the earth and an underground coal deposit,
setting a casing in the said first communication passage,
establishing a hermetic seal between the surface of the earth and the underground coal deposit,
establishing three conduit means within the said first communication passage, the first of the said three conduit means being the annulus between the said casing and a tubing installed within the said casing, the second of the said three conduit means being the annulus between the said tubing and a pipe installed within the said tubing, and the third of the said three conduit means being the conduit within the said pipe,
establishing a fracture radially outward from the said communication passage and into the said underground coal deposit,



deepening the said first communication passage through the lowermost portion of the said underground coal deposit and into the underburden to form a sump,
installing pump means in fluid communication with the said pipe,
positioning the said pump means within the said sump,
removing accumulated liquids from the said first communication passage through the said third conduit means and delivering the said liquids to the surface of the earth, and
withdrawing methane from the said underground coal deposit through the said first conduit means.

4,089,375

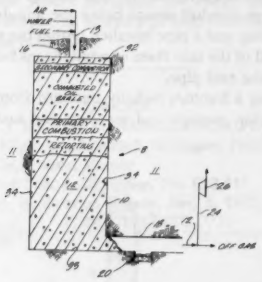
IN SITU RETORTING WITH WATER VAPORIZED IN SITU

Chang Yul Cha, Bakersfield, Calif., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.

Continuation-in-part of Ser. No. 728,911, Oct. 4, 1976, abandoned, and Ser. No. 615,558, Sep. 22, 1975, Pat. No. 4,036,299, which is a continuation-in-part of Ser. No. 492,289, Jul. 26, 1974, abandoned, said Ser. No. 728,911, is a continuation-in-part of Ser. No. 648,358, Jan. 12, 1976, abandoned, which is a continuation of Ser. No. 465,097, Apr. 29, 1974, abandoned. This application May 13, 1977, Ser. No. 796,696
Int. Cl.[2] E21B *43/24, 43/26*
U.S. Cl. 166—261 **37 Claims**

35. A method for introducing water vapor into a primary combustion zone advancing through an in situ oil shale retort containing a fragmented permeable mass of particles containing oil shale, comprising the steps of:
(a) introducing liquid water into the fragmented permeable mass at a location on the trailing side of the primary combustion zone; and

(b) burning fuel at a temperature greater than the boiling temperature of water in the fragmented mass adjacent the



location of the introduction of water into the fragmented mass for vaporization of the introduced liquid water.

4,089,376

CEMENTING AGAINST EVAPORITES

Joseph U. Messenger, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 16, 1976, Ser. No. 714,713
Int. Cl.[2] E21B *33/14*
U.S. Cl. 166—293 **4 Claims**

4. A method of cementing a pipe in a well penetrating the earth, comprising the steps of:

(a) forming a pumpable cement slurry comprised of hydraulic cement, silica flour in an amount within the range of 30 to 40 percent based on cement, attapulgite in an amount within the range of 0.1 percent to 4 percent based on cement, sodium chloride in an amount within the range of 18 to 37 percent based on mixing water, d-glucono delta lactone in an amount within the range of 0.05 to 1 percent based on cement, water and weighting agent in an amount to provide a density of said cement slurry within the range of about 13 to 21 pounds per gallon;

(b) positioning said slurry in the annular space formed intermediate said pipe in the wall of said well; and

(c) maintaining said slurry in said annular space to allow said slurry to set and bond said pipe to said wall of said well.

4,089,377

SEAL ADAPTOR ALIGNMENT MEANS AND LANDING TOOL AND METHOD

Georges M. Chateau, Pau, France, assignor to Societe Nationale Elf Aquitaine (Production), Courbevoie, France

Filed Jan. 27, 1977, Ser. No. 763,112
Int. Cl.[2] E21B *33/03, 23/00*
U.S. Cl. 166—315 **27 Claims**

1. An adaptor means for aligning two members to be connected in sealed relationship, comprising:

a body member including

an inner hollow cylindrical portion having a throughbore and defining a longitudinal axis,

said inner portion having a preselected length;

at least two part-cylindrical segments spaced radially outwardly of said inner cylindrical portion and in concentric relation thereto,

said segments having a length greater than the length of said inner portion;

said body member having a passageway between at least one of said segments and said inner portion adapted to receive a tubular member extending in the direction of said inner portion for a distance less than the length of said inner portion.

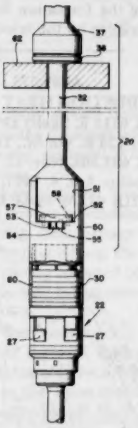
10. In a method of landing a tubing hanger in a well casing comprising the steps of:

lowering said tubing hanger into the well casing by means of a pipe string having swivel means above said tubing hanger;

interposing rams to intercept and support said swivel means prior to landing of said tubing hanger;

rotating said tubing hanger by rotating said pipe string in one direction;

locking said tubing hanger against rotation at a selected angular position of said tubing hanger with respect to said well casing;



shearing a pin above said swivel means to permit rotation of said pipe string in an opposite direction;

rotating said pipe string in an opposite direction for advancing the pipe string portion connected to said tubing hanger below said swivel means;

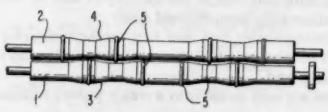
and advancing said tubing hanger downwardly without rotation until said tubing hanger is landed.

4,089,378

COPY PAPER EXHAUSTING ROLLER UNIT FOR USE IN ELECTROPHOTOGRAPHIC COPYING MACHINE

Katsuo Suzuki, Tokyo, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Feb. 1, 1973, Ser. No. 328,697
Claims priority, application Japan, Feb. 3, 1972, 47-13677[U]
Int. Cl.[2] A62C *1/00*; G03G *15/00*
U.S. Cl. 169—54 **5 Claims**



1. A roller unit for removing copy paper from an electrophotographic copying machine, said unit comprsing a drive roller and an idler roller, each having a plurality of longitudinally extending portions where the diameter of every other portion is larger than its adjacent portions, said rollers being disposed adjacent one another so that the larger portions of said drive roller are adjacent the smaller portions of said idler roller, and a plurality of rings disposed about said rollers to establish a substantially uniform clearance not greater than 1.5 mm. therebetween so that if any of said copy paper is ignited within said copying machine, the fire will be extinguished because of the clearance between said rollers, said copy paper being delivered from said copying machine with a predetermined rigidity along its direction of movement because of the

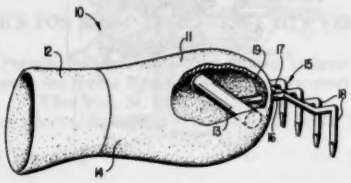
said disposition of said rollers with respect to one another to thereby lessen the tendency for said copy paper to turn over as it is delivered from said copying machine.

4,089,379

GLOVE AND TOOL DEVICE

Frederick S. Crownover, Rte. 1, Box 27, Columbiana, Ala. 35051

Filed Jan. 19, 1977, Ser. No. 760,553
Int. Cl.[2] A01B *1/06, 1/14*
U.S. Cl. 172—370 **8 Claims**



1. A glove and tool device, comprising: a glove element having upper and lower portions connected by side portions and an opening at one end thereof for insertion of the hand of a user of the device, said opening being in free communication with the entire interior of the glove element; a bar grip positioned on the interior of said glove element to provide a grip which may be grasped by insertion of the hand through the opening and extending the fingers and thumb around said bar grip, said bar grip being in a generally horizontal position and fixedly attached at each of its ends to each of the opposite interior side portions of said glove element; a longitudinally extending handle member having one end thereof attached to the bar grip and a tool element attached to the opposite end of said handle member, said tool element being provided with a base portion extending laterally in both directions from said handle member, said opposite end of said handle member being attached directly to said base portion, said tool element extending outwardly from the base portion thereof to an earthworking edge, said handle member extending outwardly from the end of said glove element which is opposite to that in which the opening is located such that said tool element is on the exterior of said glove element, a major portion of the longitudinal extent of said handle member being within said glove, whereby control of said tool element is facilitated.

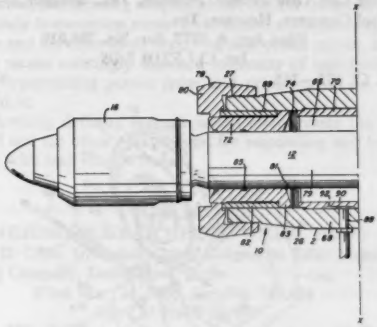
4,089,380

HAMMER HAVING FLUID BIASED WORK MEMBER

George A. Hibbard, Claremont, N.H., assignor to Joy Manufacturing Company, Pittsburgh, Pa.

Division of Ser. No. 478,289, Jun. 11, 1974, abandoned. This application Apr. 7, 1975, Ser. No. 565,531
Int. Cl.[2] E21C *3/24, 3/34*
U.S. Cl. 173—133 **13 Claims**

1. In a fluid operative hammer assembly wherein a piston member is axially reciprocable within an elongated chamber of a body for percussively actuating in elongated work member adjacent one axial end thereof for movement of such work member in one axial direction from a position at which said work member is impacted by said piston member, the improvement comprising: said work member including a laterally enlarged diameter portion which in conjunction with said body defines a variable volume cushion chamber axially spaced from said elongated chamber; and means for supplying gas into said cushion chamber at a pressure above atmospheric pressure when said work member is located in said position and for sealing said chamber whereby the pressure of said gas



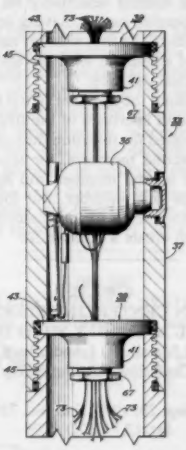
increases as said work member moves in said one axial direction.

4,089,381

CHAMBER ISOLATOR AND SEALING MEANS FOR BOREHOLE PERFORATING TOOLS

Bobby J. Hallmark, Fort Worth, Tex., assignor to Gearhart-Owen Industries, Inc., Fort Worth, Tex.

Filed Feb. 26, 1976, Ser. No. 661,796
Int. Cl.[2] E21B *43/117*
U.S. Cl. 175—4.6 **15 Claims**



11. In a borehole perforating tool of the type wherein there are provided a plurality of chambers, with each chamber containing one or more shaped charge units and with each chamber having a cylindrical sidewall which is a part of the tool body and is threaded at its end portions, the improvement comprising:

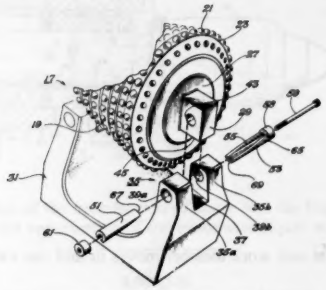
(a) the said threaded end portions of adjacent chambers are respectively male and female, with the extreme end of the male threaded portion and the inner end of the female threaded portion forming shoulders, so that a recess is formed by said shoulders when the sidewalls of adjacent chamber are threadedly joined;

(b) chamber end closures, each having a peripheral flange portion that is retained within said recess when the sidewalls of adjacent chambers are threadedly joined, with said recess being the sole means retaining a said respective chamber end closure.

4,089,382
CUTTER MOUNTING FOR A LARGE HOLE EARTH BORING BIT

Rudolf Carl Otto Pessier, Houston, Tex., assignor to Hughes Tool Company, Houston, Tex.

Filed Apr. 4, 1977, Ser. No. 784,019
Int. Cl.[2] E21B 9/08
U.S. Cl. 175—361 6 Claims



1. In an earth boring drill bit of the type having at least one cutter shell mounted to a bearing carrier that is carried by a frame, an improved means for mounting the bearing carrier to the frame comprising:

a first member formed selectively on one of the frame and the bearing carrier and having two spaced apart ends with apertures on each end axially aligned with each other;

a second member formed selectively on the other of the frame and the bearing carrier, having an end for insertion between the ends of the first member and an aperture that is spaced out of alignment with the apertures of the first member a selected distance;

means for maintaining the aperture of the second member in nonalignment with apertures of the first member; and

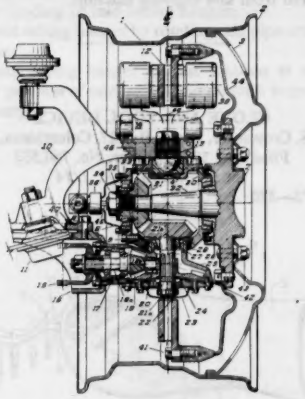
wedge means, adapted for insertion through the apertures of the first and second members, for tending to draw the aperture of the second member into alignment with the apertures of the first member, the force exerted being transmitted to the means for maintaining the apertures in nonalignment to create a positive fit.

4,089,383
POWER DRIVEN CENTERLINE STEERING SAFETY AXLE WHEEL ASSEMBLY WITH DISC BRAKE

John D. Blood, and Melvin R. Inbody, both of Findlay, Ohio, assignors to The Centerline Steering Safety Axle Corporation, Findlay, Ohio

Filed Sep. 29, 1976, Ser. No. 727,874
Int. Cl.[2] B62D 7/08
U.S. Cl. 180—43 R 5 Claims

4. A dirigible wheel assembly for a surface vehicle comprising: a wheel; a transmission housing; a wheel spindle journalled in said housing; means securing said wheel to said spindle for rotation therewith; a yoke for attaching said wheel assembly to a surface vehicle and having upper and lower arms; an integral pinion housing and gear housing secured to said lower arm; bearing means supporting said transmission housing on said arms for turning movement about a vertical steering axis lying in a plane normal to the center line of said transmission housing and coincident with the vertical center line of said wheel; an annular brake rotor attached to said spindle and presenting annular brake shoe engaging surfaces lying in planes normal to the axis of rotation of said spindle; a brake caliper assembly having support arms attached to said transmission housing; said brake caliper assembly including brake shoes on both sides of said brake disc for pressing against said respective brake shoe engaging surfaces; a pinion having means for receiving power from a source of power on said vehicle; a gear within said transmission housing and secured to said spindle for rotation therewith; an inter-connected gear assembly connected with

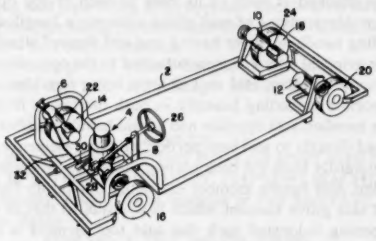


said pinion and with said gear for rotating said spindle, wheel and brake rotor; and means for attaching said transmission housing to a steering system of said vehicle.

4,089,384
SELF-PROPELLED LAND VEHICLE

Gustave Ehrenberg, 133 Golf Hills Rd., Havertown, Pa. 19083

Filed Jan. 31, 1977, Ser. No. 764,370
Int. Cl.[2] B60K 17/30
U.S. Cl. 180—44 E 16 Claims



1. A self-propelled land vehicle comprising:

a frame;

a power source supported on said frame;

a plurality of wheels arranged to support said frame from a roadway and to propel said frame by rotation of said wheels;

each of said wheels having its own motor associated with it in driving relationship thereby forming a plurality of indpendent motor-wheel systems;

controllable means for connecting each said motor to said power source for delivery of driving power to each said motor;

each of said motor-wheel systems including an arm pivotally supported on said frame, and adapted to swing about a normally horizontal axis, the wheel of each motor-wheel system being for rotation about an axis of rotation supported at an end of the arm of said system remote from said normally horizontal axis, and the motor of each motor-wheel system also being supported on the arm of said system, the axis of rotation of the wheel being rigidly connected to the motor housing through said arm whereby the housing of the motor is caused to move in response to swinging movements of the wheel axis about said normally horizontal axis, and said motor being at a

location closer to said normally horizontal axis than the axis of rotation of the wheel of said system is to said normally horizontal axis, said location being such that the center of gravity of the motor approximately coincides with said normally horizontal axis;

means for maintaining said motor-wheel systems in a position such that a straight line extending perpendicularly between the normally horizontal axis of each system and the corresponding wheel axis, forms an acute angle with the roadway; and

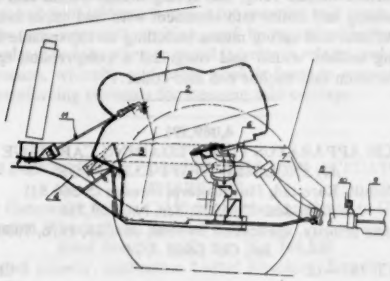
spring means and damping means associated with each of said motor-wheel systems, and acting on the arm thereof.

4,089,385

DEVICE FOR BINDING AN ENGINE TO A VEHICLE CHASSIS OR BODY

Daniel Payoux, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

Filed Nov. 24, 1976, Ser. No. 744,777
Claims priority, application France, Nov. 27, 1975, 75 36341
Int. Cl.² B60G *13/00*
U.S. Cl. 180—64 R **7 Claims**



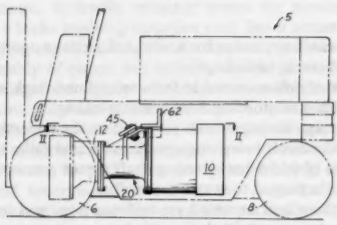
1. Device for binding a power unit resiliently connected to a chassis of a vehicle, the device being interposed between two anchoring systems rigid with said power unit and said chassis, respectively, wherein one of said anchoring systems carries means for self-adjusting the length of the binding device, said means being fastened to one end of a retaining member having a negligible compression and flexion rigidity, the opposite end of said retaining member being fastened to the other anchoring system.

4,089,386

DRIVE MOUNT HOUSING FOR A VEHICLE

Elmer Balchick, Euclid, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed May 20, 1977, Ser. No. 798,954
Int. Cl.² B60K *1/00*
U.S. Cl. 180—64 R **6 Claims**



1. A vehicle drive train mounting, the vehicle including a frame, a prime mover and transmission means, the drive train mounting for drivingly associating said prime mover with said transmission means and comprising:

a housing for support of said prime mover in a cantilevered fashion, said housing adapted at one end for fixture to said vehicle transmission means and adapted at the other opposite end for removably receiving said prime mover; and

drive means rotatingly disposed internally of said housing for transmitting power from said prime mover to said vehicle;

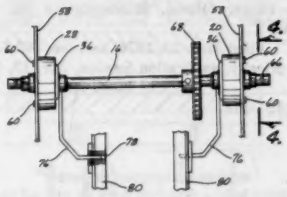
said housing defining support means intermediate the one end and the other opposite end for associating said housing with said vehicle frame.

4,089,387

ADJUSTABLE RATCHETING WHEEL HUB

Harold D. Cook, Urbandale, Iowa, assignor to Edko Manufacturing Company, Des Moines, Iowa

Filed Mar. 23, 1977, Ser. No. 780,424
Int. Cl.² B60K *23/04*
U.S. Cl. 180—76 **10 Claims**



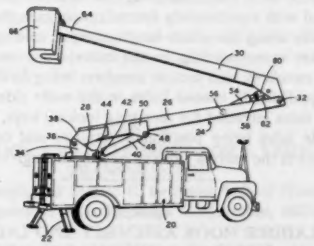
1. An improved ratcheting wheel hub having a pawl driven wheel hub, a pawl carrier housing a double end reversing pawl for rotational engagement with said wheel hub, means for reversing rotation of said pawl and said wheel hub, a bearing cover to cover said pawl carrier, and an axle operationally connected to said pawl carrier, wherein the improvement comprises means for selectively detachably mounting said pawl carrier at a plurality of positions on said axle so as to selectively vary the axial distance between two wheels, and means for maintaining said bearing cover in a stationary non-rotational position against said pawl carrier.

4,089,388

FLUID CONTROL SYSTEM

Leonard L. Johnson, Fort Wayne, Ind., assignor to Teco, Inc., Fort Wayne, Ind.

Filed Sep. 7, 1976, Ser. No. 720,569
Int. Cl.² B66F *11/04*
U.S. Cl. 182—2 **10 Claims**



1. A mobile articulated tower comprising a combination lower and upper boom having an articulated connection therebetween, a work basket at the free end of the upper boom, means forming a base pivotal mounting for the lower boom, means forming a base pivotal mounting for the lower boom, a

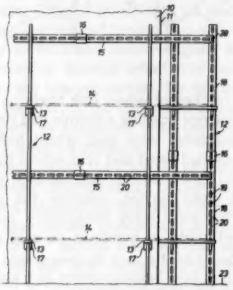
first power actuating means for effecting pivoting of said upper boom about the lower boom, a second power actuating means for effecting arcuate movement of the lower boom about its base pivotal mounting and a third power actuating means for effecting angular movement of both said booms about the base pivotal mounting therefor, closed center hydraulically operated and operator controlled actuator means, one for each of said first, second and third power actuating means and each including a pilot valve and a servo valve, each of said pilot valve and servo valve including a spool valve with grooved lands and axial slots which impart operating characteristics of fluid flow whereby operation of either the pilot valve or the servo valve will effect non-linear response of the actuator means associated with each of the three movements of the boom during initial movements from neutral positions of said pilot and servo valves respectively, and effecting linear high speed response at the full open positions of said pilot valve and servo valve respectively.

4,089,389

SCAFFOLD

Lars-Uno Verner Olsson, Stenhogagatan 11, Oxie, Sweden (S523030)

Filed Mar. 23, 1976, Ser. No. 669,536
Claims priority, application Sweden, Apr. 17, 1975, 7504441
Int. Cl.² E04G *1/08*
U.S. Cl. 182—178 **5 Claims**



1. A scaffold comprising vertically joined upright members and horizontal beams supported by said upright members and working platforms in the nature of battens or the like intended to rest on said beams, wherein said upright members and said beams members consist of interchangeable hollow elongate section members each having an identical essentially rectangular cross section, each one of said upright members and said beam members being capable of being used either as an upright member or as a beam member; said section members being provided with equidistantly spaced openings in the wide sides, essentially along the whole length thereof; said openings having a size corresponding to the outer cross section of said section members; said section members being further provided with equidistantly spaced holes in the wide sides and in the narrow sides intended for receiving locking keys, said holes in the wide sides being positioned between said openings, and said holes in the narrow sides extending through said openings.

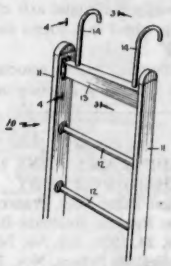
4,089,390

LADDER HOOK ASSEMBLY AND LADDER

Philippe Hardy-Thé McLain, Columbia, S.C., assignor to Shakespeare Company, Columbia, S.C.

Filed Jun. 8, 1976, Ser. No. 693,859
Int. Cl.² E06C *1/36*
U.S. Cl. 182—206 **17 Claims**

1. A ladder hook assembly comprising
a hollow ladder rung;
at least one hook having a shank passing through said rung; and
a locking mechanism securing said hook to said rung for selective rotation relative to said rung, said locking mechanism including a collar secured to said shank within said



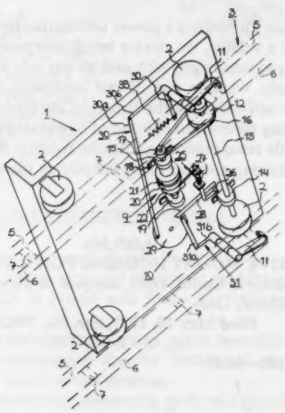
rung and disposed in abutment with an upper interior surface of said rung, and spring means within said rung biasing said collar into abutment with said upper interior surface, said spring means including an expandable locking anchor within said rung and a compression spring between said anchor and said collar.

4,089,391

CATCH APPARATUS FOR A LOADING CARRIAGE ON AN INCLINED DRIFT ELEVATOR

Tage Schill, Karestad, Hovmantorp, Sweden (S-360 51)

Filed Jan. 17, 1977, Ser. No. 759,716
Claims priority, application Sweden, Jan. 23, 1976, 7600684
Int. Cl.² B66B *5/26*
U.S. Cl. 187—12 **7 Claims**



1. A catch apparatus for a wheeled carriage operating on an inclined track, including:
a pair of rails mounted to form an inclined track, and having spaced reinforcing elements therealong;
a carriage having wheels mounted on the underside thereof, said wheels being engageable with said rails, and at least one of said wheels having shaft means connected thereto and arranged to rotate therewith;
a locking unit mounted on said carriage, and including at least one catch hook movable between a retracted position and an active position, said catch hook being arranged to engage with said reinforcing elements along said rails when in said active position thereof, and said locking unit

including: resilient means arranged to urge said catch hook to move toward said active position; and catch means arranged to releasably secure said catch hook in said retracted position for normal operation of said carriage; and

a sensing unit mounted on said carriage and associated with said catch means and said shaft means, said sensing unit being effective to release said catch means when the rotary speed of said one wheel exceeds a predetermined value, and including: a drive shaft rotatably mounted on the underside of said carriage; means interconnecting said drive shaft with said shaft means, effective to rotate said drive shaft in response to rotation of said one wheel; a sensing disk mounted on said drive shaft; a sliding clutch connecting said sensing disk with said drive shaft; a spring actuated release weight eccentrically attached to said sensing disk, and adapted upon exceeding of a predetermined value of the rotary speed of said one wheel to be moved radially outwards into a projecting, triggering position; an operating lever mounted on the underside of said carriage in a position to be engaged by said release weight when such is in said triggering position, and said disk is rotating, said operating lever being normally engaged with said catch means for securing said catch hook in said retracted position, and being movable by said release weight when engaged thereby to release said catch means, whereby said catch hook is freed to engage said reinforcing elements for stopping said carriage.

4,089,392

SELF-ENERGIZING DISC BRAKES AND ACTUATOR THEREFOR

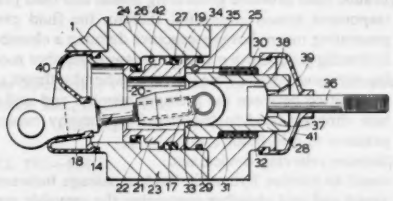
Piotr Ostrowski, Sutton Coldfield, England, assignor to Girling Limited, Birmingham, England

Filed Jan. 31, 1977, Ser. No. 764,530

Claims priority, application United Kingdom, Jan. 29, 1976, 3461/76

Int. Cl.² F16D *55/14*

U.S. Cl. 188—71.4 **16 Claims**



1. A disc brake comprising a relatively stationary housing, co-operating friction members located in said housing and having relatively rotatable friction surfaces, brake applying means for urging said friction surfaces into engagement, a first pull-rod projecting from said housing and acting on said brake applying means, hydraulic actuator means for moving said pull-rod in a brake applying direction such that it actuates said brake applying means, said hydraulic actuator means comprising an assembly of piston and cylinder members, one of said members being fixed rigidly with respect to said housing and having a bore, the other of said members being movable relative to said housing and acting on said first pull-rod, (and) a second pull-rod coupled axially to said first pull-rod in a brake applying direction for parking or emergency braking, and said first pull-rod comprises first and second parts and screw-threaded connecting means between said parts allowing relative rotation therebetween to alter the effective length of said first pull-rod, said connecting means and second part being located within said bore with seal means sealing said connecting means and said second part in said bore, and said fixed member includes external releasable rotating means for rotating said second part of said pull-rod relative to said first part.

4,089,393

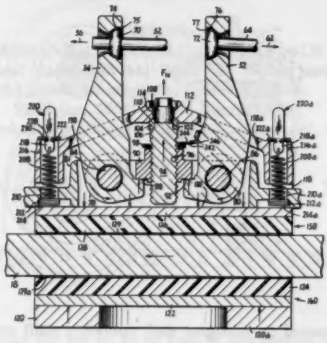
CAM ACTUATED DISC BRAKE

Edward J. Falk, St. Louis County, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.

Continuation of Ser. No. 703,933, Jul. 9, 1976, abandoned. This application Aug. 10, 1977, Ser. No. 823,506

Int. Cl.² F16D *55/26*

U.S. Cl. 188—72.6 **29 Claims**



1. In a vehicle having at least one axle and at least one disc service brake of the type having at least one friction member adapted to frictional contact with the radial face of a brake disc, the improvement comprising:

(a) a caliper;

(b) means for holding said friction member adjacent to said brake disc;

(c) at least one lever;

(d) means for applying force to said at least one lever;

(e) a cam carrier mounted between said caliper and said at least one friction member;

(f) cam means pivoted to said cam carrier, said cam means being actuated by said at least one lever for exerting force in response to said applied force to said caliper;

(g) said cam means applying opposing force through at least one pivot to said cam carrier;

(h) means on said cam carrier for bearing against said friction member and exerting said opposing force on said friction member, and exerted force being effective to urge said friction member into frictional contact with said brake disc;

(i) means on said cam carrier for preventing rotation of said cam means about an axis parallel to the axis of the brake disc during actuation thereof; and

(j) said means for applying force acting on said lever with a line of action substantially parallel to the face of said brake disc.

4,089,394

PARK LOCK AND GEAR SHIFT FOR A VEHICLE TRANSMISSION

Robert C. Haupt, and Donald E. Peterson, both of Wauwatosa, Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

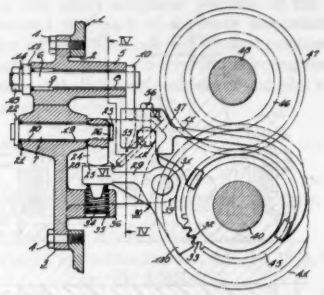
Filed Dec. 13, 1976, Ser. No. 750,233

Int. Cl.² B60L *1/00, 9/00*

U.S. Cl. 192—4 A **10 Claims**

1. A park lock and range shift mechanism on a transmission comprising, a transmission housing, a transmission housing cover mounted on the side of the transmission housing, a park lock operating shaft defining a pivotal axis pivotally mounted

in said housing cover, a cam defining a surface eccentric with said pivotal axis connected to said park lock operating shaft, a park lock lever including a cam follower arm and an arm having a gear segment for locking a drive shaft pivotally mounted on said housing cover, a gear shift operating shaft defining a pivotal axis pivotally mounted in said housing cover, a shift rail carrying a gear shifting fork slideably mounted in said housing cover, a gear shift arm on said gear shift operating shaft for slideably operating said shifting fork in said transmission, a park lock operating arm on said park lock operating shaft pivoting said park lock operating shaft, a shift operating



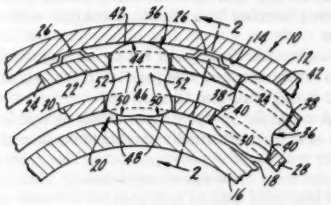
arm mounted on said gear shift operating shaft rotating said gear shift operating shaft for slideably operating said shifting fork, a spring release normally biasing said park lock lever to a release position, an interlock pin positioned between said park lock operating shaft and said gear shift operating shaft selectively moving to an interlock position to prevent rotation of one of said shafts while the other of said shafts is pivoted, control means for selectively rotating said gear shift operating arm or said park lock operating arm to thereby shift said range shift transmission or operate said park lock mechanism in said transmission.

4,089,395

DIRECTION-SENSITIVE OVERRUNNING CLUTCH

Mark John Fogelberg, Muncie, Ind., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Oct. 21, 1976, Ser. No. 734,496
Int. Cl.[2] F16D *41/07*
U.S. Cl. 192—41 A **11 Claims**



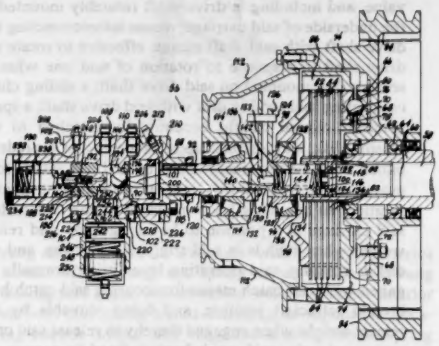
1. A clutch comprising first and second clutch members rotatable about a common axis, and a sprag assembly interposed between said members, said sprag assembly including first and second cages, first means frictionally biasing said first cage to said first member, second means frictionally biasing said second cage to ground, and a plurality of sprags freely supported by said cages between said members, said sprags being pivotable to a first position in wedging engagement with said members and to a second position disengaged from said members.

4,089,396

CLUTCHES

Donald J. Quick, Bundaberg, Australia, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed Sep. 7, 1976, Ser. No. 721,131
Claims priority, application United Kingdom, Sep. 9, 1975, 36960/75
Int. Cl.[2] F16D *43/21*
U.S. Cl. 192—56 F **9 Claims**



1. A torque transmission device comprising:
a torque input member;
clutch elements;
a thrust generating self servo device; and
a torque output member;
the clutch elements and the self servo device being connected between the torque input and torque output members, whereby torque can be transmitted from the torque input member through the self servo device and the clutch elements to the torque output member
characterized by
thrust responsive reaction means connected to the self servo device and responsive to a rise in thrust generated thereby above a predetermined level comprising
hydraulic fluid pressure generating means and fluid pressure responsive means connected thereto, the fluid pressure generating means having structure defining a chamber for hydraulic fluid and a movable pressure member mounted for movement within the chamber whereby thrust can be transmitted between the pressure member and said structure through fluid in the chamber, thereby raising the pressure of said fluid,
a pressure-relieving device, and
a vessel to receive hydraulic fluid, a passage between said vessel and said chamber containing the movable pressure member, and a pressure relief valve in said passage to control the flow of fluid from said chamber to said vessel, said pressure relief valve comprises a valve member and a valve seat, the valve seat being provided by a wall of said chamber.

4,089,397

CONTROL MECHANISM

Masanao Baba, Takarazuka, Japan, assignor to Nippon Cable System Inc., Japan

Filed Dec. 22, 1976, Ser. No. 753,226
Claims priority, application Japan, Dec. 24, 1975, 50-155219
Int. Cl.[2] B60K *41/02*
U.S. Cl. 192—.096 **5 Claims**

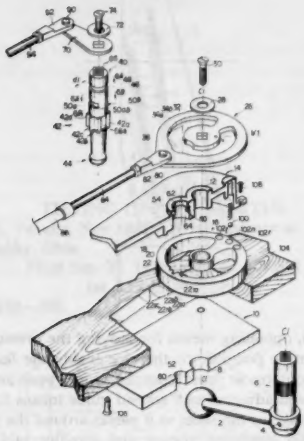
1. A control mechanism for the clutch and throttle of engine comprising:
a lever means;
a housing means;
an axle journaled in said housing means and turnable by said lever means;

a throttle operating means comprises a throttle operating disk secured to said axle;

said throttle operating disk being formed with a circular arc surface which are centered about the center of said axle;

a throttle cable operable by said throttle operating means;

a gear means rotatably journaled in said housing means through circular arc apertured portion of the throttle operating disk and provided with a gear portion having an untoothed portion therein meshable with the gear portion of said throttle operating disk,



said gear means being rotatable about 90° in either direction from a neutral position with the rotation of said throttle operating means;

a clutch arm secured on said gear means; and

a clutch rod pivoted to said clutch arm at the outer end thereof;

said clutch arm being lockable after the rotation about 90° with the rotation of the throttle operating disk and the throttle operating disk alone being further rotatable.

4,089,398

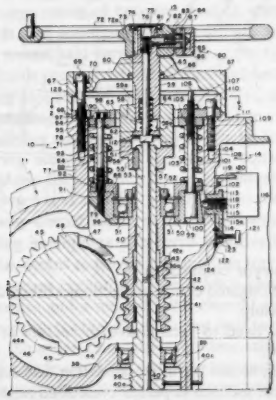
AUTOMATIC RELEASING LOCK

Andrew Stratienko, Philadelphia, Pa., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Apr. 4, 1977, Ser. No. 784,390

Int. Cl.² F16D *13/60*

U.S. Cl. 192—114 R **6 Claims**



1. In a drive system having a power shaft and a power transfer clutch slidably mounted on said power shaft; a locking system for locking said clutch in a retracted position on said shaft only while it is non-rotating, said locking system comprising:

a peripheral locking recess formed on said power transfer clutch and having cam means formed therein;

means continuously biasing said clutch toward a non-retracted position;

a plurality of resiliently biased detent plungers arranged in a fixed radial position for engagement in said locking recess; and,

said detent plungers being displaced axially from each other.

4,089,399

MECHANICAL HANDLING APPARATUS

John Edmund Richard Webb, Bodorgan, Wales, assignor to Hydraroll Limited, Birmingham, United Kingdom

Filed Oct. 26, 1976, Ser. No. 735,573

Claims priority, application United Kingdom, Jul. 6, 1976, 28124/76

Int. Cl.² B60P *1/52*

U.S. Cl. 193—35 SS **7 Claims**

1. A device for use as or as part of mechanical handling apparatus which can support a load both during movement of the load into position and when the load is static, the device comprising an elongate body member, a support for loads movably supported on said body member, an inflatable device associated with the body member and connected to the support whereby said support can be raised and lowered between a position in which a load can be moved over the device and a position in which a load is supported in a desired position along the device, and stop means movably supported on said body member and comprising a substantially flat stop plate which is movable relative to said body member between a first position wherein the plate is disposed substantially horizontally and a second position wherein the plate is disposed substantially vertically, said plate laying substantially parallel to the direction of load movement and forming part of the support when in the first position whereby passage of said load along the device is possible, and said plate when in said second position being supported in an upright position on said body member and projecting upwardly above the uppermost load engaging point on the support when it is in its raised position for preventing passage of said load along the device.

4,089,400

COIN TESTING DEVICE

Lester Gregory, Jr., 3845 1st Ave., N., St. Petersburg, Fla. 33713

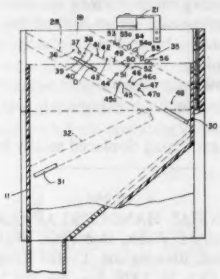
Filed Jan. 23, 1976, Ser. No. 651,832

Int. Cl.² G07F *3/02*

U.S. Cl. 194—97 A **13 Claims**

1. A coin testing device for discriminating between acceptable coins and unacceptable coins, comprising: a downwardly sloping coin feed chute having a coin infeed end and a coin discharge end; coin deflector means at the discharge end of the chute and operable between a coin reject position and a coin accept position; diameter testing means associated with the chute for testing the diameter of a coin; light emitting means and associated light sensitive means disposed along the chute after the diameter testing means and positioned opposite one another along an axis inclined to the plane of the coin in position to direct light diagonally across an edge of the coin to detect the thickness of a coin moving along the chute; said diameter testing means operatively connected to set for opera-

tion the light emitting means and associated light sensitive means; and circuit means connected with the light emitting means and light sensitive means and with the coin deflector



means, and operative in response to detected thickness to operate the coin deflector means to accept coins having the proper thickness and to reject coins having improper thickness.

4,089,401

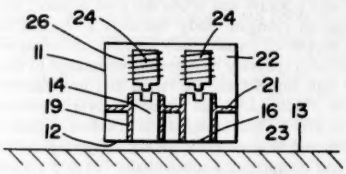
SEGMENTED PRINTOUT DEVICE

Thaddeus Leroy Scott, 360 Hyde Dr., Hayward, Calif. 94544

Continuation-in-part of Ser. No. 731,449, Oct. 12, 1976, abandoned. This application Oct. 11, 1977, Ser. No. 840,566

Int. Cl.[2] B41J *7/00*

U.S. Cl. 400—125.1 **7 Claims**



1. A printout device comprising a printing block, a plurality of paramagnetic printing segments disposed in said block and arrayed in indicia-forming patterns, the like ends of said printing segments disposed adjacent to a pressure sensitive printing surface, means for permitting limited longitudinal movement of said printing segments in said block, a plurality of driver elements disposed within said block, each axially aligned with one of said printing segments, slot means and key means interposed between said driver elements and said printing segments and each associated with one of said driver elements and said printing segments for selective longitudinal force coupling therebetween, electromagnetic means for urging one of said slot means and key means to rotate to permit a longitudinal force coupling disposition, and means for permitting limited rotational movement of said slot and key means between a force coupling and non-coupling disposition.

4,089,402

SHEET FEEDING MECHANISM FOR AN AUTOMATIC TYPEWRITER

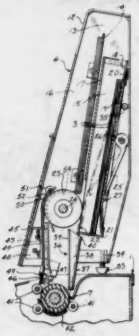
Francis P. Hyland, Wauwatosa; Hugo E. Borchert, Greenfield, and Harlan J. Pilon, Waukesha, all of Wis., assignors to Hy Grip Products Co., West Allis, Wis.

Filed Jul. 1, 1976, Ser. No. 701,569

Int. Cl.[2] B41J *11/58*

U.S. Cl. 400—625 **16 Claims**

1. A sheet feeding mechanism for an automatic typewriter having a platen, comprising a housing defining a supply compartment for storing a supply pack of sheets to be typed and defining a storage compartment for storing a series of typed sheets, a feed roll mounted for rotation with respect to the housing and disposed to rotate in contact with an outermost sheet in the supply compartment to remove the outermost sheet from the supply pack, first guide means for guiding the sheet removed from the supply pack to the platen of the typewriter in preparation for typing said sheet, second guide means for guiding the typed sheet from the platen to the storage compartment, releasable pressure means having an operable pressure exerting position wherein the feed roll and the supply pack are forced into intimate contact and having an inopera-



tive position, operating means for moving the pressure means to the operative position, to thereby enable the feed roll to remove the outermost sheet from the supply pack and sensing means disposed adjacent said second guide means for sensing the leading edge of the sheet as it passes around the platen for actuating said operating means and moving said pressure means to the inoperative position, whereby the force between said pressure means and said feed roll is released during typing of the sheet.

4,089,403

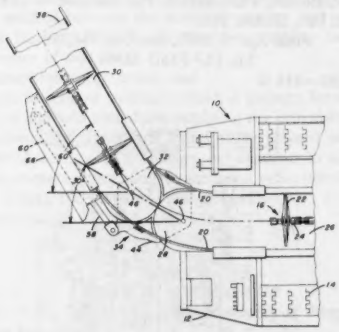
SWIVEL ASSEMBLY FOR A CONVEYOR

Donald L. Freed, Jr., and Gerald L. Baum, both of Belleville, Ill., assignors to National Mine Service Company, Pittsburgh, Pa.

Filed Nov. 9, 1976, Ser. No. 740,300

Int. Cl.[2] B65G *21/14, 41/00*

U.S. Cl. 198—316 **14 Claims**



1. A conveyor comprising,

a pair of elongated conveyor sections arranged in end to end relationship,

a segment fixed to each conveyor section at its respective said end,

connecting means for interconnecting said segments of said conveyor sections to permit controlled relative movement of one segment with respect to the other segment,

a link member pivotally connected to each of said conveyor

sections about axes coincident with the centers of said segments respectively,

means operatively connected to said link member for pivotally rotating said link member through an arcuate path, and

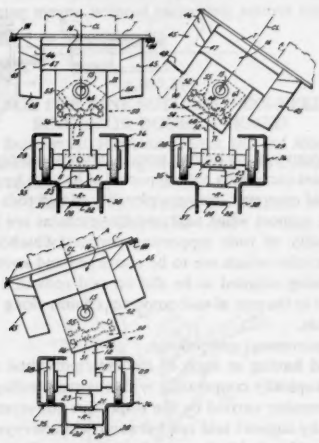
said means for pivotally rotating said link member including an extensible means connected to said link member and one of said conveyor sections.

4,089,404

TILTING TRAY APPARATUS

Charles E. Venzke, New Berlin, Wis., assignor to A-T-O, Inc., Willoughby, Ohio

Filed Sep. 29, 1976, Ser. No. 727,394
Int. Cl.[2] B65G *47/94*
U.S. Cl. 198—365 **25 Claims**



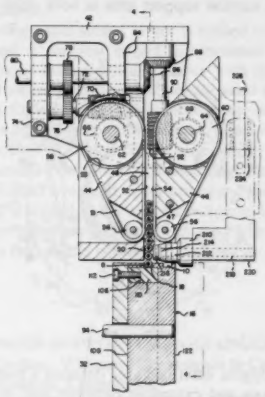
1. Sorting conveyor apparatus including a plurality of carriages which are conveyed between loading stations, for accepting articles, and sorting stations having a plurality of article receiving means, said carriages being of the type having a truck and a tiltable tray carrier means mounted on the truck for selective tilting movement to discharge articles, said tray carrier means including a tray, and said tray carrier means being tilted at said sorting station to discharge articles from said tray into a receiving means, and wherein said carriages further comprise yieldable friction latch means operatively connected between said truck and said tray carrier means for frictionally holding said tray carrier means in an article carrying position and for yielding in response to a force selectively exerted on said tray carrier means to permit tilting of the tray carrier, said friction latch means comprising a first latch element on said tray carrier means and a second latch element on said truck, one of said elements frictionally engaging, and exerting a holding force on, the other element for holding said tray carrier means in said article carrying position, and said latch means yielding to permit tilting of the tray carrier means upon the exertion of a force upon one element by the other in excess of said holding force.

4,089,405

LEAD MAKING MACHINE HAVING IMPROVED FEEDING MEANS

Phillip Eugene Loomis, Harrisburg; James Woodrow Hammond, Camp Hill, and Mervin Leonard Shughart, Carlisle, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 16, 1976, Ser. No. 723,697
Int. Cl.[2] B65G *33/02*; H01R *43/04*
U.S. Cl. 198—475 **5 Claims**



1. In an apparatus for conveying wires serially laterally of their axes for a predetermined distance and then feeding each wire axially, said apparatus comprising, a wire conveying and feeding drum having a cylindrical surface, drive motor means for rotating said drum, a wire receiving groove in said cylindrical surface, said groove extending circumferentially around said drum and towards one end of said drum, confining means extending adjacent to said surface and towards said one end of said drum for confining said wires in said groove, and pressure roller means adjacent to said one end of said drum for applying pressure to a wire disposed in said groove at a location adjacent to said one end, the improvement comprising:

a concentric circumferential recess extending into said drum from the end which is opposite to said one end, said recess extending towards said one end, a fixed member in said recess, first portions of said groove being formed by a slot in said drum which extends from said cylindrical surface to said recess whereby said first portions of said groove have an inner end which is formed by the surface of said support member whereby,

upon placing a wire in said groove while said drum is rotating, said wire will be conveyed laterally of its axis and towards said one end, and after lateral conveyance, said wire will be fed axially by said drum in cooperation with said pressure roller.

4,089,406

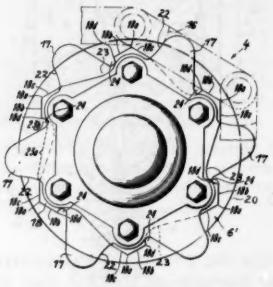
CHAIN DRIVE

Fritz Teske, Industriestrasse 28, and Lothar Teske, Industriestrasse 30, both of Porz-Westhoven, Germany

Continuation of Ser. No. 513,503, Oct. 9, 1974, abandoned. This application Feb. 15, 1977, Ser. No. 768,708
Int. Cl.[2] B65G *19/08, 19/20*
U.S. Cl. 198—730 **7 Claims**

1. In a chain drive including an endless drag conveyor chain formed of interconnected links, each link having a fork constituted by parallel-extending fork legs including a base portion, shoulder faces disposed at the base portion and fork leg ends remote from the base portion; a drive sprocket and a return sprocket about which the chain is trained; each sprocket having an axis of rotation, first and second series of teeth arranged circumferentially on the periphery of each sprocket, the first series of teeth and the second series of teeth defining an axial

space therebetween; each tooth having a leading flank and a trailing flank, each tooth having a circumferentially measured thickness that is smaller than the distance from the shoulder faces to the fork ends of the adjoining link; each sprocket further having a polygon disposed in the space between the first and the second series of teeth; the polygon having axially parallel edges separating the polygon sides from one another, the polygon having peripheral support faces for radially supporting the links in their passage on the sprockets, the improvement wherein each said peripheral support face of said polygon is formed of a narrow support area at both sides of each said



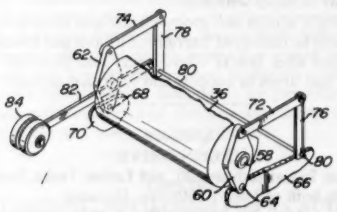
edge of the polygon, each said area defining a plane parallel to the sprocket axis and extending between said tooth series in said axial space and being substantially out of registry with any of said teeth when viewed circumferentially; each said support area further being, when viewed in the axial direction, substantially in its entirety out of registry with any of said teeth for providing a radial support for said links adjacent said teeth when viewed circumferentially; said support areas of said polygon constituting the sole radial support of said links in said sprockets; said links being substantially without radial support at any location in circumferential alignment or in axial alignment with any of said teeth.

4,089,407

CONSTANT BELT TENSIONER

Kenneth W. Bullivant, Millville, N.J., assignor to K-tron Corporation, Glassboro, N.J.

Filed Jan. 31, 1977, Ser. No. 764,105
Int. Cl.² B65G *23/44*
U.S. Cl. 198—815 **5 Claims**



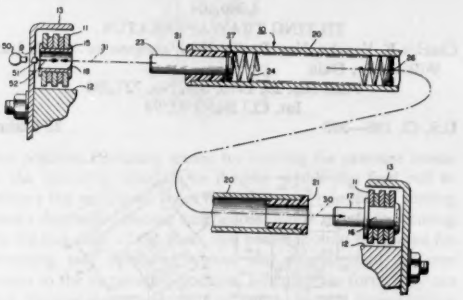
1. A constant belt tensioner comprising an endless belt extending around first and second rollers, belt tensioning means connected to one of said rollers for adjusting the tension of said belt, said belt tensioning means including a weight connected to one portion of a lever arm, another portion of said lever arm being fixedly connected to a shaft and being perpendicular thereto, said shaft being located between the runs of said belt and being rotatable about its longitudinal axis which is parallel to said one roller, said belt tensioning means including first and second levers perpendicular to and fixedly connected to said shaft for rotation therewith, said first and second levers being perpendicular to the portion of said lever arm fixedly connected to said shaft, and said first and second levers being substantially shorter than the length of said lever arm.

4,089,408

QUICK-CHANGE ROD ASSEMBLY FOR CONVEYOR

Frank B. Vanderhoof, Lake Forest, N.J., assignor to Metramatic Corp., Landing, N.J.

Filed Oct. 22, 1976, Ser. No. 734,991
Int. Cl.² B65G *17/12*
U.S. Cl. 198—848 **4 Claims**



1. In a conveyer switching system having two parallel conveyer chains carrying a rod supported at its ends by respective ones of said conveyer chains, a plurality of said rods providing a moving support when said respective chains are in motion, said plurality of rods supporting carriers which guide and control articles which are to be conveyed and switched, said carriers being adapted to be slid on said rods in a direction, transverse to the run of said conveyer chains, along the length of said rods,

the improvement comprising:

said rod having at each of its ends individual means for telescopically cooperating with a corresponding supporting member carried by the respective conveyer chain, to thereby support said rod between said conveyer chains;

one of said individual means for telescopically cooperating comprising a pin moveable with respect to said rod between a position wherein it protrudes from the body of said rod and a position wherein it is withdrawn into the body of said rod and further comprising stop means to hold said pin captive to said rod for movement only between said positions; and

spring biasing means carried by said rod for moving said pin into operative relationship with said corresponding supporting member;

whereby when said spring biasing means is overcome, said operative relationship ceases, and said rod can be removed from said conveyer chains;

said rod substantially bridging the span between said supporting members carried by the respective conveyer chains, whereby any force components on said rod parallel thereto are transmitted directly from said rod to said corresponding supporting members by abuttment of said rod against one of said supporting members; and

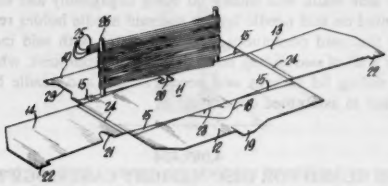
manual means to overcome said spring bias to release said rod from locking relationship, said manual means to overcome said spring bias being incapable of self actuation or actuation by said conveyer switching system.

4,089,409

PACKAGE FOR MULTISTRAND SURGICAL SUTURES

Robert J. Cerwin, Pittstown, N.J., assignor to Ethicon, Inc., Somerville, N.J.

Filed Feb. 4, 1977, Ser. No. 765,579
Int. Cl.[2] A61L 17/02
U.S. Cl. 206—63.3 19 Claims



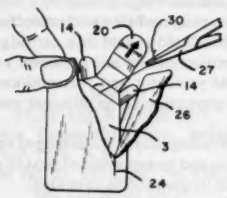
1. A multistrand suture package providing individual suture delivery comprising a plurality of suture strands in substantially parallel alignment, said suture strands being wound in the configuration of a coil comprising a series of convolutions disposed in sequence from one end of the suture to the other with each convolution being laterally displaced from adjacent convolutions, and retaining means holding the wound suture strands in the aforesaid configuration with one end of said suture strands extending from said retaining means, whereby individual suture strands may be grasped and withdrawn from said retaining means, without entangling sutures remaining in the package.

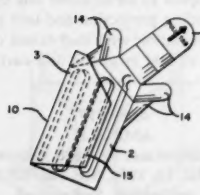
4,089,410

PACKAGE FOR FINE SUTURES, NON-NEEDLED, SINGLE OR DOUBLE ARMED

Lelia Ann Bolanowski, Hoffman Estates, Ill., and Alison Flatau, New Fairfield, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Sep. 6, 1977, Ser. No. 831,030
Int. Cl.[2] A61L 17/02
U.S. Cl. 206—63.3 5 Claims





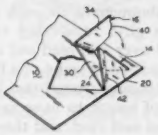
1. A direct dispensing surgical suture label comprising
a strand back panel;
a strand cover containing a score line and a diagonal cut on the top portion of said cover opposite said panel;
a strand cover side flap containing a score line, and a slit on the top portion of said score line, the top of said flap aligned with the diagonal cut of said cover;
a needle pocket consisting of a needle panel adjacent and on a diagonal to the top portion of said strand panel and connected by a diagonal score line, and two needle panel side flaps on opposite sides of said needle panel each consisting of an upper rounded portion and a lower triangular portion, said upper portion connected to said needle panel and said lower portion connected to said strand panel by score lines;
a needle cover consisting of an upper and lower portion adjacent to the top of said needle panel;
a suture dispensing tab adjacent the top portion of said upper needle cover;
whereby when said strand cover is folded over said strand panel and a surgical strand is contained between said strand panel and said strand cover with the ends of said surgical suture placed on said needle panel and said needle panel is folded under said strand panel and said needle flaps are folded under said needle panel and said lower needle cover is folded under said needle flaps and said upper needle cover is folded over said strand cover and the tab folded over said upper cover and said strand cover side flap is folded under said strand panel such that when the suture dispensing tab is pulled the ends of said surgical suture in said needle pocket is presented for direct dispensing.

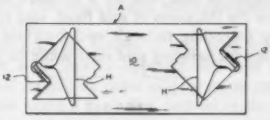
4,089,411

HANGER SUPPORTING ARRANGEMENT

Jeffrey M. Gardner, Wheaton, Ill., assignor to Container Corporation of America, Chicago, Ill.

Filed Jul. 20, 1977, Ser. No. 817,151
Int. Cl.[2] B65D 73/00, 85/00
U.S. Cl. 206—300 8 Claims





1. A hanger support arrangement, formed of a unitary blank of foldable paperboard, for a garment container, comprising:
(a) a relatively thin, flat base panel;
(b) a hanger supporting structure including a pair of inner and outer members formed of material cut from said base panel;
(c) said inner member including:
(i) a first element foldably joined at one edge to said base panel;
(ii) a second element foldably joined at one edge to another edge of said first element;
(d) said outer member including:
(i) a first element foldably joined at one edge to said base panel;
(ii) a second element foldably joined at one edge to another edge of said outer member first element;
(e) the elements of said inner member being folded normal to each other, and the elements of said outer member being folded into parallel relationship with each other, with the second element of said inner member being interposed between the elements of said outer member to provide said supporting structure;

(f) said outer member second element having interlocking relationship with said base panel to maintain said structure in erected condition;

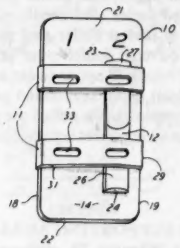
(g) said second element of said inner member and both elements of said outer member having substantially similar configurations.

4,089,412

MUSICAL INSTRUMENT REED STORAGE ASSEMBLY

Karol Baugh, Schofield, Wis., assignor to Impact Industries, Inc., Wausau, Wis.

Filed Mar. 11, 1977, Ser. No. 776,629
Int. Cl.[2] C25D *17/00*
U.S. Cl. 206—314 **4 Claims**



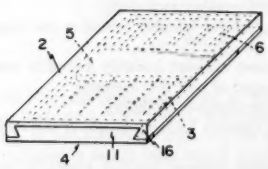
1. A musical instrument reed storage assembly comprising a base piece of a block configuration and having a flat surface extending across one side of said base piece, a musical instrument reed having a flat surface extending across one complete side thereof and with said reed disposed on said base piece with the said flat surfaces in abutment with each other, and an elastic band of an endless girth removably extending fully around said base piece and over said reed and across said flat surface of said bass piece, said band being of a free-body girth length to stretch when extending around said base piece and over said reed and being of length to have said elastic band snug on said base piece and said reed, and thereby press said reed flat against said flat surface of said base piece, and said elastic band being of a width sufficient to extend into contact along the length of said reed for a distance which is at least several times the thickness of said band, said band has at least one opening extending through said thickness and extending over said reed for aerating said reed while on said base piece.

4,089,413

NEEDLE CONTAINER

Katsuhiko Fukuyama, Midorii 3099, Sato-cho, Hiroshima-shi, Hiroshima, Japan

Filed Feb. 23, 1977, Ser. No. 771,299
Int. Cl.[2] B65D *85/24*
U.S. Cl. 206—382 **13 Claims**



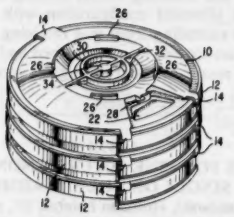
1. A needle retainer comprising a needle holder for holding needles, a needle holder retainer on which said needle holder is seaprably mounted, said needle holder having inclined side wall portions, said needle holder retainer having inclined side wall portions comprising a first wall section and a second wall section, said first wall section being spaced from said second wall section, said needle holder and said needle holder retainer having their respective side wall portions aligned to form a continuous side wall when the needle holder is placed in said needle holder retainer with said inclined side wall portions of said needle holder disposed in said space between said first and second wall sections, a sliding lid having a top portion and downwardly depending side sections which have inclined inner side walls, said sliding lid being engageably and slidably mounted on said needle holder and said needle holder retainer such that said continuous side wall mates with said inclined inner wall of said sliding lid to define a dovetail joint, whereby said sliding lid secures said needle holder and needle holder retainer in assembled condition.

4,089,414

BASE GUARD FOR DISC MEMORY CARTRIDGE PACK

Joseph Sandor, Reseda, and Vern Evert Goode, San Jose, both of Calif., assignors to Innovative Computer Products, Tarzana, Calif.

Filed Apr. 4, 1977, Ser. No. 783,987
Int. Cl.[2] B65D *85/62, 85/02;* G11B *1/02*
U.S. Cl. 206—444 **8 Claims**



1. A protector for use in stacking magnetic disk cartridges having a raised rectangular projection on its upper surface comprising:

resilient means for removably attaching said protector to one of said disk cartridges;

an indentation configured into said protector to expose said underlying handhold in said disk cartridge;

a plurality of projections on said protector vertically extending from said protector and juxtapositioned outside said rectangular projection on an adjacent magnetic disk cartridge; and

a vertically extending projection arranged and configured to be disposed in and juxtapositioned next to said handhold in said adjacent magnetic disk cartridge,

whereby each magnetic disk cartridge is registered and locked with respect to an adjacent one by means of said vertically extending projection and said plurality of projections in combination with said raised rectangular projection of each of said magnetic disk cartridges.

4,089,415

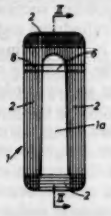
AMPULE

Jakob C. Laib, Einfangstrasse 39, 8580 Amriswil, Switzerland

Filed Jul. 14, 1976, Ser. No. 705,081
Claims priority, application Switzerland, Aug. 15, 1975, 10684/75
Int. Cl.[2] B65D *3/26, 17/24*
U.S. Cl. 206—484.2 **14 Claims**

1. An ampule comprising a wall enclosing a hollow compartment for receiving drugs which can be dispensed with the aid of a syringe having a syringe needle, the wall bounding the hollow compartment comprising a carrier layer formed of pore-free aluminum foil capable of being punctured by a syringe needle without damaging the needle and having an inner layer with a sterilizable heat-sealable material which does not

react with the contents of the ampule, an exposed, marked puncture location being provided at the outside of the carrier



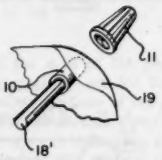
layer and at which location the wall can be pierced by means of the needle of the syringe without damaging such needle.

4,089,416

UMBRELLA TIP REPAIR KIT

Joseph Wade Sims, 7139 Mt. Vernon St., Pittsburgh, Pa. 15208

Filed Mar. 22, 1977, Ser. No. 780,033
Int. Cl.[2] B65D *69/00*
U.S. Cl. 206—582 **5 Claims**



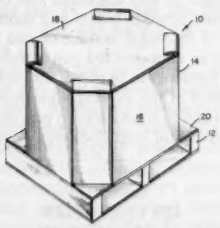
1. An umbrella tip repair kit of the type for manually securing an umbrella cover to the tip of an umbrella rib, wherein the kit comprises a short section of flexible tube adapted to be manually expanded over and frictionally grip the cylindrical end of the rib, and a separate screw cap adapted to be screwed over said tube with a peripheral section of the umbrella cover therebetween, said screw cap compressing said tube on the umbrella rib.

4,089,417

FLAP LOCK BULK BIN

Edward L. Osborne, Kansas City, Kans., assignor to Westvaco Corporation, New York, N.Y.

Filed Jul. 25, 1977, Ser. No. 818,290
Int. Cl.[2] B65D *19/34*
U.S. Cl. 206—600 **2 Claims**



1. A combination pallet/bulk bin container prepared from corrugated paperboard material or the like, comprising:

(a) a pallet;

(b) a bulk bin container of generally octagonal shape positioned on top of said pallet, said bulk bin container consisting of a plurality of side walls, each of said side walls haing attached to the ends thereof primary and secondary end closure flaps; and,

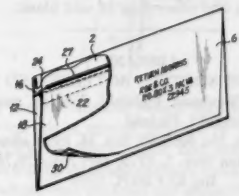
(c) end closure caps for said bulk bin container prepared from generally rectangular flat sheets of the container material and cut and scored to form rectangular caps and octagonally shaped caps, said end closure caps being cut and scored to accept selected ones of said primary or secondary end closure flaps internally of said container for the purpose of securing said end caps to said bulk bin container, said rectangular end caps have slits located inboard from and parallel to the side edges thereof for accepting the primary end flaps and said octagonal end caps include slits and scores at each corner thereof, said scores forming end corner flaps which are inserted inside said container and said slits forming openings inboard of and parallel to said scores for accepting the secondary end flaps wherein like closure caps or different closure caps may be secured to each end of said container.

4,089,418

RETURNABLE MAIL ENVELOPE

Robert S. Yale, 1660-A Avon Pl., NW., Washington, D.C. 20007

Filed Feb. 25, 1977, Ser. No. 772,108
Int. Cl.[2] B65D *27/32, 27/06*
U.S. Cl. 206—632 **2 Claims**



1. A blank for a returnable mail envelope comprising:

a sheet of material having a main rectangular panel;

a first panel foldably hinged to a first side edge of said main panel;

end flaps foldably hinged to the end edges of said main panel and having side edges spaced throughout their lengths from said first side edge of said main panel and generally parallel thereto;

a second panel foldably hinged to said main panel along a second side edge thereof opposite said first panel, said second panel having an outer edge portion comprising a strip foldable along a score line parallel to the side edges of said main panel and having a moisture activatable adhesive thereon on one face of said blank, the width of said second panel from said second side edge to said score line being substantially equal to the width of said end flaps along said end edges; and

releasable adhesive means on said first panel, on the other face of said blank.

4,089,419

REVERSIBLE ENVELOPE

Robert S. Yale, 1660-A Avon Pl., NW., Washington, D.C. 20007

Filed Sep. 29, 1977, Ser. No. 837,866
Int. Cl.[2] B65D *27/32, 27/06*
U.S. Cl. 206—632 **8 Claims**

1. A blank for forming a reversible and returnable envelope, comprising:

a sheet of material defining a main panel of generally rectangular shape;

an end flap foldably joined to each end of said main panel;

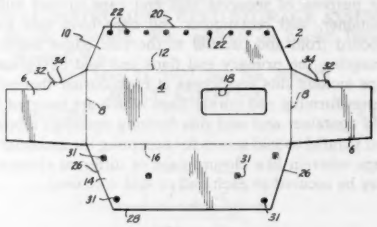
a first flap foldably joined to one side edge of said main panel;

a second flap foldably joined to the other side edge of said main panel;

the outer edge portion of said first flap having releasable adhesive means thereon on one face of said blank;

the outer edge portion of said second flap having moisture activatable adhesive extending therealong on the other face of said blank;

further releasable adhesive means on said blank for releasably holding said second flap to said end flaps when said



second flap overlies said end flaps over said one face of said blank;

said main panel having a window therethrough; and

said first flap having a return address printed thereon, on said other face of said blank in position to appear through said window when said first flap is folded to overlie said main panel on said other face of said blank.

4,089,420

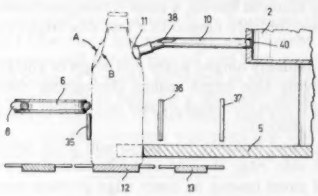
APPARATUS FOR SORTING BOTTLES AND THE LIKE

Gunnar Bernhard Sundman, Helsinki, Finland, assignor to Oy Hartwall AB, Helsinki, Finland

Continuation of Ser. No. 505,990, Sep. 16, 1974, abandoned. This application Nov. 7, 1975, Ser. No. 629,784

Int. Cl.[2] B07C *9/00*

U.S. Cl. 209—80 **5 Claims**



1. Apparatus for sorting bottles of at least two types, whose difference resides at least in the contour of one portion of the bottles, comprising at least one feeding track for unsorted bottles; at least one discharge track for each type of bottle; and a sorting device connecting the feeding track with the discharge tracks through which the bottles are arranged to pass one by one in arbitrary order, and which comprises a transporting means for transporting the bottles along a given path, said transporting means comprising a number of successive bottle pockets each arranged to take one bottle from the feeding track and from which the sorted bottles are removed, a vacuum system, at least one suction cup arranged in connection with each bottle pocket and connected with said vacuum system, means subjecting the suction cups to the influence of vacuum only over a limited part of the conveyor track, each suction cup being formed and placed in the bottle pocket so that it corresponds to the contour of one type of bottle which is to be held by the suction cup, but leaves any other type of bottle untouched, said one type of bottle having a non-cylindrical portion, each bottle which has been suctioned by a cup being released by disengagement of the vacuum at a desired later discharge track, while the bottles not influenced by any suction cup, after having passed through the sorting device, are arranged to end up directly in a first discharge track, said transporting means comprising a rotatable wheel member, the vacuum system comprising at least one vacuum chamber rotating with the wheel member for a plurality of suction cups, and radially directed tubes connecting said at least one vacuum chamber with its corresponding suction cups, said at least one vacuum chamber being cylindrical and including a non-rotating arc-shaped slide rail for connecting and disconnecting the vacuum chamber with the respective suction cups, an endless belt positioned to engage and center bottles in the pockets as the bottles are being selectively suctioned by the suction cups, said radially directed tubes being carried adjacent the pockets with the suction cups on free ends of said tubes, said tubes being so positioned that the suction cups thereon come into contact with said at least one portion of one configuration of bottle while the configuration of said at least one portion of the other bottles does not come into contact with the suction cups and are not influenced thereby.

4,089,421

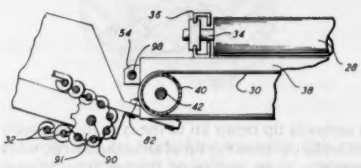
METHOD AND STRUCTURE FOR AUTOMATICALLY SEPARATING UNWANTED MATERIALS FROM MACHINE HARVESTED TOMATOES

Wellington W. Porter, Dublin Road, R.D. 2, Waterloo, N.Y. 13165

Continuation-in-part of Ser. No. 604,820, Aug. 14, 1975, abandoned. This application Oct. 13, 1976, Ser. No. 731,901

Int. Cl.[2] B07B *13/04*; B07C *1/10, 5/04*

U.S. Cl. 209—97 **1 Claim**



1. A method of separating soft and crushed fruit and other foreign matter from a supply of machine-harvested tomatoes, comprising:

a. passing a continuous supply of tomatoes and vines through a harvesting machine of the type adapted to remove the fruit from the vines;

b. moving the supply of fruit through the machine to a discharge section including a solid conveyor belt having a high traction surface, and a final discharge conveyor of the open link chain type, the receiving end of said final discharge conveyor being arranged to receive fruit from the discharge end of said belt;

c. positioning a solid rod parallel to and substantially across the entire width of said discharge end of said belt in an adjustably fixed position below and substantially tangent to the plane of the upper surface of said belt, and spaced therefrom by an unobstructed gap sufficient to cause soft and crushed tomatoes to be pulled through said gap by the combined effect of the moving high traction belt surface and fixed rod and firm tomatoes to pass over the rod to the receiving end of said final discharge conveyor.

4,089,422

AIR CLASSIFIER

Charles Raymond Harmke, Seattle, and Daniel Edward O'Neill, Edmonds, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Oct. 14, 1975, Ser. No. 621,926

Int. Cl.[2] B07B *4/02*

U.S. Cl. 209—137 **5 Claims**

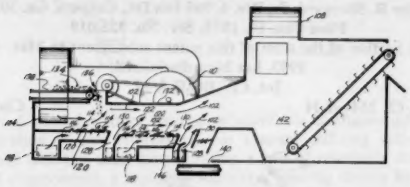
4. A process of separating a heterogeneous mixture of heavy and light particles into heavier and lighter fractions comprising

a. establishing a horizontal flow of primary air longitudinally through the horizontal passageway from an upstream to a downstream end at a suitable velocity to transport at least lighter fraction particles longitudinally through the passageway;

b. establishing a flow of deck air through the upper surface of a divided air deck extending along the bottom of the passageway, the air deck flow moving upwardly at an angle so that it has both a horizontal and a vertical component of motion, with the horizontal component moving in the same direction as the flow of primary air, a first portion of the air deck lying upstream of a second portion, and both portions extending downstream from that area of the passageway where primary air flow is first established;

c. feeding a heterogeneous mixture of heavy and light particles downwardly into the passageway at an area thereof above the first portion of the air deck;

d. injecting into the passageway from the bottom thereof just



downstream of the area of the passageway where the heavy and light particles are fed thereinto and between the first and second portions of the air deck a flow of air that is independent of deck air flow and including a vertical component of motion flowing generally towards the top of the passageway, the velocity of the last said air flow being sufficient to cause stratification of light and heavy particles;

e. collecting heavy fraction particles that have settled to the bottom of the passageway and are moving downstream therealong under the influence of the horizontal primary and deck air flows by allowing such heavy fraction particles to drop through a collection opening in the bottom of the passageway downstream of the second portion of the air deck;

f. collecting light fraction particles by separating them from the air flows moving through the passageway entirely downstream of the heavy fraction collection area of the passageway.

4,089,423

RIFLE STAND

Jack R. Gorham, 3966 Lugo, Lynwood, Calif. 90262, and Harold W. Chalker, 12820 Frailey, Compton, Calif. 90221

Filed Jan. 17, 1977, Ser. No. 759,919
Int. Cl.[2] A47F *7/00*
U.S. Cl. 211—64 **8 Claims**

1. A rifle stand including an elongate, vertical, spade-like spike with front and rear surfaces, a horizontal top, downwardly and inwardly converging sides defining an earth piercing point, a vertically extending rearwardly opening channel and a horizontal, foot-engaging header extending transverse said top and overlying the upper end of said channel; an elongate normally horizontal butt support means with front and rear ends defining vertically disposed support surfaces and defining two laterally spaced forwardly disposed stops spaced rearward from the header and engageable with the butt ends and rearwardly disposed butt heels of rifle stocks related to the stand, means pivotally and frictionally securing the front end of the support means to the header and rearward of the spike whereby said support means is shiftable downwardly and forwardly to a vertical position adjacent said rear surface; manually operable releasable retaining means carried by the header releasably engaging the support means to hold it horizontal; stock grip-engaging means including an elongate vertical column slidable longitudinally in the channel from a down position where its upper end terminates adjacent said top to an up position where its lower end portion is engaged in and between the header and channel and a horizontal rest plate at the upper end of the column defining two laterally spaced vertically and rearwardly opening notches in common later-

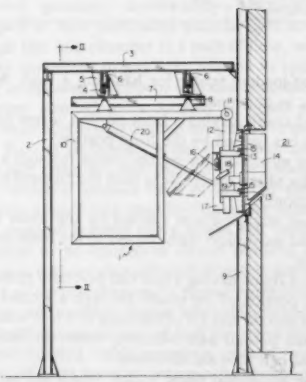
ally spaced parallel vertical planes with said stops and on a lateral vertical plane spaced forward of the lateral vertical plane on which said stops occur, said notches receiving and engaging forwardly disposed edges of stock grips related to the stand and whose butt portions are supported and stopped by said support means, said retaining means releasably engaging and selectively stopping said column in said up and down positions.

4,089,424

DEVICE FOR REMOVING COKE OVEN CHAMBER DOOR

Franz Steimann, Gelsenkirchen-Horst, and Claus Nagorny, Dinslaken, both of Germany, assignors to Didier Engineering GmbH, Essen, Germany

Filed Dec. 10, 1976, Ser. No. 749,617
Claims priority, application Germany, Dec. 30, 1975, 2559130
Int. Cl.[2] B66C *13/00*; C10B *25/00*
U.S. Cl. 212—4 **2 Claims**



1. A device for removing in a block of ovens chamber doors

of the type including a locking mechanism pressing the door against a door frame surrounding an outlet opening of an oven chamber and including removing latches, said device comprising:

a supporting structure adapted to be fixedly positioned adjacent a block of oven chambers, said supporting structure having thereon rails extending substantially parallel to the oven block;

a traverse member suspended from said rails and movable along said rails in a direction substantially parallel to the oven block;

a frame suspended from said traverse member and movable therealong toward and away from each oven chamber in a direction substantially perpendicular to that of the traverse member;

a door support pivotally suspended from said frame about a horizontal axis extending substantially parallel to said oven block;

door removing jaws displaceably mounted on said door support;

first drive means, mounted on said door support, for moving said jaws into engaging contact with removing latches of a chamber door of the chamber oven;

second drive means, mounted on said door support, for locking or unlocking a door locking device of said chamber door, said second drive means being operable independently of said first drive means; and

third drive means, mounted between said frame and said door support, for pivoting said door support and a removed door supported thereby about said horizontal axis toward and away from the chamber opening, said third drive means being operable independently of said first and second drive means.

4,089,425

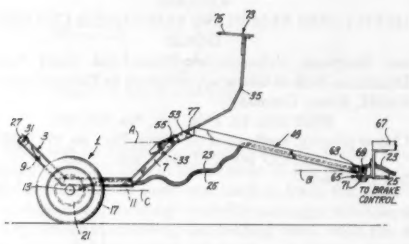
SELF-LOADING TRAILER

Harold D. Baltz, Rte. #3, Box 228, Pocahontas, Ark. 72455

Filed Jul. 1, 1975, Ser. No. 592,207

Int. Cl.[2] B60P *1/04*

U.S. Cl. 214—1 HH **10 Claims**



1. A self-loading trailer for handling a load, which trailer comprises, in combination:

a. a load cradle having a front portion, a rear portion and a cross bar carried by the front portion;

b. wheel means supporting the cradle through a first pivotal axis for tilting the cradle in both the forward and rearward directions;

c. a load engaging arm carried by the cross bar for free pivotal movement with respect to the front portion of the cradle;

d. a hitch frame having a first end pivotally connected to the front portion of the cradle through a second pivotal axis and a second end for connecting to a tow vehicle through a third pivotal axis wherein, when the trailer is being pulled in a forward direction;

1. the horizontal plane within which the second pivotal axis is located is disposed above the cross bar, and

2. the horizontal plane within which the third pivotal axis is located is disposed above the horizontal plane within which the first pivotal axis is located;

e. the hitch frame including at least one leg portion extending substantially rearwardly of the second pivotal axis for bearing downwardly against the cross bar and stopping the forward tilting movement of the cradle, with the second pivotal axis being disposed intermediate the leg portion and the second end of the hitch frame; and

f. a cross brace for supporting the pivotal arm in a substantially upwardly extending position, which cross brace is carried by the first end of the hitch frame and is disposed forwardly of and above the cross bar when the trailer is being pulled in a forward direction.

4,089,426

APPARATUS FOR ALIGNING PRE-ASSEMBLED PARTS

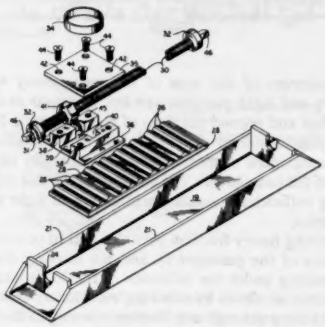
Walter R. Sheppard, Jr, Rte. 6, 969 Iris Dr., Conyers, Ga. 30207

Filed Jan. 19, 1973, Ser. No. 325,018

The portion of the term of this patent subsequent to Mar. 16, 1993, has been disclaimed.

Int. Cl.[2] B66F *7/12*

U.S. Cl. 214—1 H **4 Claims**



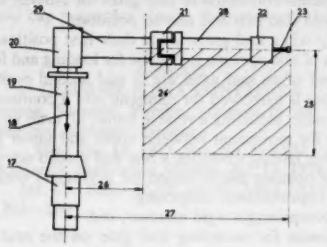
1. A sectional traversing assembly for a jack comprising an approximately rectangular pan member including a bottom wall with a generally flat upwardly facing surface, side walls extending upwardly from said bottom wall, and end walls, a ladder bearing including a frame and a plurality of needle bearings connected at their ends to said frame, said ladder bearing being shorter than said pan member and freely movable along the length of said pan member between said end walls with its needle bearings in rolling engagement with the bottom wall of said pan member and confined in said pan member by the side walls and end walls of said pan member, a jack platform positioned on the needle bearings of said ladder bearing and movable with respect to said ladder bearing a distance approximately equal to the distance of movement of said ladder bearing along said pan member as the ladder bearing moves along said pan member, an externally threaded travel screw, an internally threaded nut member engaging said travel screw and carried by said jack platform, said travel screw being connectable at its ends to the end walls of said pan member, whereby the pan member can be positioned under an object to be moved, the ladder bearing placed in the pan, the jack platform placed on the needle bearings of the ladder bearing with the ends of the travel screw extending from the jack platform and connected to the end walls of the pan and a jack positioned on the platform and the travel screw rotated to move the jack platform and jack along the length of the pan member with the ladder bearing moving along the pan member beneath the jack platform at approximately one-half the rate of movement of the jack platform.

4,089,427

MODULAR ROBOT HAVING AN ADAPTABLE CONFIGURATION

Pierre Pardo, and Francois C. Pruvot, both of Meudon-la-Foret, France, assignors to Sofermo, Meudon-la-Foret, France

Filed Sep. 15, 1976, Ser. No. 723,665
Claims priority, application France, Sep. 22, 1975, 75 28913
Int. Cl.[2] B25J *17/00;* B66C *13/12*
U.S. Cl. 214—1 CM 10 Claims



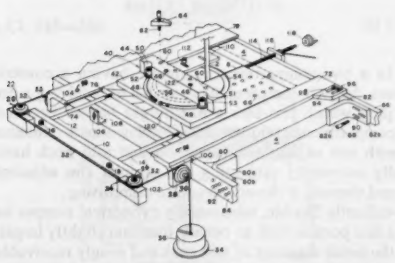
1. A modular robot having an adaptable configuration for operation in any coordinate axis system, utilizing self-contained modules each incorporating a pair of relatively driven end components, a motor, a reduction gearing driven by the motor and operatively connected to drive a module and the sucessively connected modules and means for measuring the relative positions of the pair of relatively driven end components of said module, said robot comprising as many of said self-contained modules as there are elementary movements of translation and rotation that can be accomplished by the robot, said modules being interconnectable and arranged and disposed in the coordinate axes system for the application contemplated for said robot, and two successive modules being interconnected by a connecting tube of which the length is subordinate to the application contemplated, each end of said tube being detachably fastened to a respective end component of said two successive modules by means of identical standard fastening means.

4,089,428

WORKPIECE HOLDER AND FEEDER DEVICE FOR BAND SAWS AND OTHER MACHINES

Eliyahu Zlaikha, Raziel Street 39, Natanya, Israel

Filed Oct. 4, 1976, Ser. No. 729,151
Claims priority, application Israel, Oct. 3, 1975, 48232
Int. Cl.[2] B23Q *5/24*
U.S. Cl. 214—1.5 6 Claims



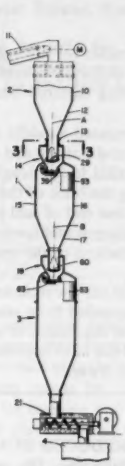
1. A workpiece holder and feeder mountable on a rectangular base of a machine tool, comprising: a pair of parallel cross-bars engageable with two opposed sides of the base; a plurality of angle bars, one angle bar fixed at each end of each cross-bar; each angle bar having a first leg fixed to the respective cross-bar, and a second leg engageable with the adjacent one of the remaining two opposed sides of the base; a pair of parallel guide bars fixed to the cross-bars parallel to said second leg of the angle bars; the guide bars and the angle bars all being fixed to the cross-bars by adjustable fastener means enabling their adjustment with respect to the cross-bars to permit mounting the holder and feeder on different size bases; a table for supporting the workpiece and slidable on the base between said guide bars towards a work performing position; a cable having one end fixed to one of said bars; a weight suspended from the opposite end of the cable; and a plurality of rollers engageing an intermediate portion of the cable, at least one of the rollers being fixed to the slidable table and another being fixed to one of said bars such that the weight applies a continuous and uniform feeding force, as the weight lowers, to feed the table and the workpiece carried thereon towards the work performing position.

4,089,429

APPARATUS FOR INTRODUCING PARTICULATE MATERIAL INTO A VESSEL

Arthur J. Stock, Lakewood, and Reeve R. Hastings, Chagrin Falls, both of Ohio, assignors to Stock Equipment Company, Cleveland, Ohio

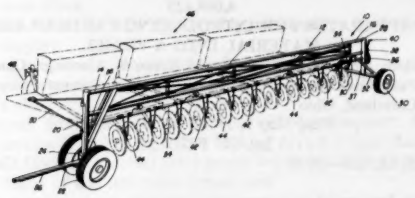
Filed May 9, 1977, Ser. No. 795,161
Int. Cl.[2] F27B *1/20*
U.S. Cl. 214—35 R 32 Claims



1. Apparatus for introducing particulate material into a chamber, comprising a chamber adapted to contain gas at a predetermined pressure; downwardly extending conduit means adapted to have particulate material flow downwardly therethrough into said chamber in a path of flow, said conduit means being connected in gas-tight relation to said chamber and having an opening that opens into said chamber; material-holding means adapted to be located in closed position in which it extends across said conduit means above said opening to prevent flow of particulate material through said conduit means into said chamber, and adapted to be located in open position in which it permits flow of material through said conduit means toward said chamber; gas valve means located below said material holding valve means and having closure means adapted to be located in closed position, to form a gas-tight seal at said opening into said chamber, and adapted to be retracted to opened position to permit particulate material to flow from said conduit means into said chamber without contacting said closure means of said gas valve means when said material holding valve means is opened, said closure means being adapted to move between its opened and closed positions through a space in said chamber below said opening; and clearing means for conveying material in one position and

for clearing material in another position, said clearing means being adapted to be moved after said material holding valve means is closed and while said gas valve means is opened to insure that said space through which said closure means of said gas valve means moves between its opened and closed positions is free of particulate material that could impair formation of a gas tight seal by said closure means of said gas valve means.

4,089,430
FARM IMPLEMENT TRAILER
Andrew F. Gosselin, R.R. 1, Bogue, Hill City, Kans. 67625
Filed May 27, 1977, Ser. No. 801,167
Int. Cl.[2] B60P *3/40*
U.S. Cl. 214—86 A **9 Claims**



1. A farm implement trailer for towing a farm implement on a highway transverse to its normal operating mode, the front of the farm implement having castered wheels, the trailer comprising:

a wheel mounted elongated straddle frame having a front end portion, a rear end portion and a center portion, said frame disposed parallel to the length of the farm implement and straddling the back of the farm implement;

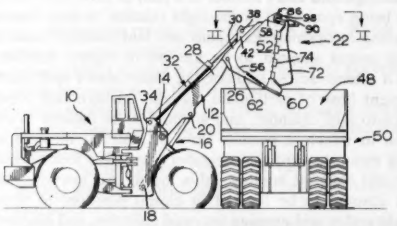
an elongated lift bar, one end of said bar rotatably attached to the front end portion of said frame, the other end of said lift bar rotatably attached to the rear end portion of said frame;

means for rotating said lift bar mounted on said frame; and

attachment means suspended from said lift bar for securing the back of the farm implement to said lift bar;

the trailer wheels and the farm implement wheels forming a vehicle for highway travel.

4,089,431
BUCKET WITH REDUCED DUMPING WIDTH
Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed Sep. 15, 1976, Ser. No. 723,408
Int. Cl.[2] E02F *3/82*
U.S. Cl. 214—146 R **8 Claims**



1. In a loader including a vehicle frame, lift arms mounted on the frame for movement between upper and lower positions, and a bucket having a bottom, rear and fixed spaced sides, said bottom and sides defining an elongated dumping opening and mounted on said lift arms for movement therewith, the improvement comprising:

two gates;

pivot means for mounting each said gate on a respective one of said sides for movement between a first position wherein each said gate extends forwardly of its respective side and does not obstruct said dumping opening, and a second position wherein each said gate extends inwardly from its respective side and partially obstructs said dumping opening, said gates, when both are in their second positions, narrowing, but not closing said dumping opening; and

motor means connected to said gates for moving said gates between said first and second positions;

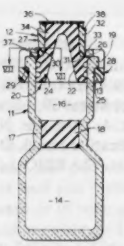
whereby when said gates are in their first position, the full width of said opening is availble for loading and for dumping and when said gates are in said second position, said opening is narrowed for dumping into a confined area.

4. In a loader including a vehicle frame, lift arms mounted on the frame for movement between upper and lower positions, and a bucket having a bottom, a rear and spaced sides defining a dumping opening and mounted for movement with said lift arms, the improvement comprising:

a gate comprising a rigid member, and

pivot means for mounting said gate on the rear in close proximity to a side of said bucket for rotation between a first position wherein the forward portion of said gate extends forwardly from the rear of the bucket and is disposed against the bottom of said bucket and does not obstruct said dumping opening, and a second position wherein said forward portion extends upwardly from the bottom and forwardly of the rear of said bucket and partially obstructs said dumping opening.

4,089,432
VIAL AND CLOSURE
Gary K. Crankshaw, Kalamazoo, and George W. Braymer, Ross Township, Kalamazoo County, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.
Filed May 6, 1977, Ser. No. 794,348
Int. Cl.[2] B65D *81/32*
U.S. Cl. 215—6 **10 Claims**



1. In a two-compartment container having a constriction between the two compartments capable of receiving a removable plug which provides a liquid-tight barrier between the two compartments, said container having a neck communicating with one of said compartments and said neck having a radially outwardly projecting and annular rim adjacent the free end thereof, a closure structure comprising:

a resiliently flexible, substantially cylindrical stopper having a first portion with an outside diameter slightly larger than the inside diameter of said neck and snugly receivable into said neck and a second portion of reduced diameter projecting beyond the free end of said neck;

resiliently flexible cap means of substantially circular cross section having a fastening portion telescopically receivable onto the free end of said neck, said fastening portion having preformed opposing means for gripping said rim, said opposing means defining circles of less diameter than the periphery of said rim, and said fastening portion in-

cluding annular means overlying the upper edge of the stopper first portion so as to oppose its removal from the vial, and said cap means having a sleeve portion of reduced diameter snugly but slidably receivable onto the second portion of said stopper, said sleeve portion being attached to said fastening portion by manually fracturable means, said sleeve portion being slidably receivable with the second portion of said stopper into said neck by the application of force urging said sleeve portion toward said container; and

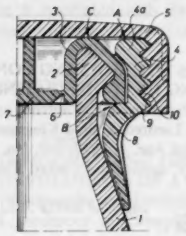
shield means attached to said outer end of said sleeve portion of said cap means for closing the outer end thereof.

4,089,433

CLOSURE FOR A CONTAINER

Knut Jonsson, Kungalv, Sweden, assignor to AB Wicanders Korkfabriker, Alvangen, Sweden

Filed Jul. 13, 1977, Ser. No. 815,432
Claims priority, application Sweden, Jul. 13, 1976, 7607971
Int. Cl.² B65D *55/02, 85/56;* A61J *1/00*
U.S. Cl. 215—218 **6 Claims**



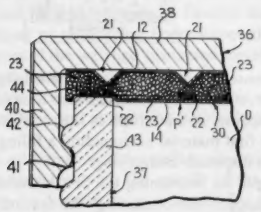
1. A closure for an open-topped container having a radially outwardly projecting rim, said closure comprising an annular collar part adapted to surround said rim, an intermediate part having an external thread and extending around said collar part and being rotatable thereon, a screw cap having an internal screw thread engaged on the screw thread of the intermediate part and means enabling the intermediate part to be held against rotation to permit said cap to be screwed onto or unscrewed from said intermediate part.

4,089,434

VENTING LINER

Peter Tagalakis, Villa Park, and James Woods, Oswego, both of Ill., assignors to Seling Sealing Products, Inc., Forrest, Ill.

Filed Dec. 10, 1976, Ser. No. 749,371
Int. Cl.² B65D *51/16*
U.S. Cl. 215—260 **22 Claims**



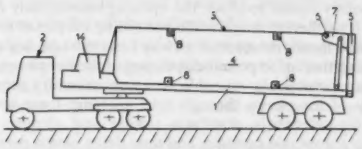
11. A combined container and closure comprising a container body including an opening circumscribed by a circumferential sealing lip, a closure including an end panel and a peripheral skirt, means removably securing said closure to said container body in closed relationship to said opening, a venting liner disposed between said end panel and said sealing lip, said venting liner comprising a disc-shaped member, said disc-shaped member being defined by at least three plies of polymeric or copolymeric material, a first of said plies being sandwiched between second and third of said plies, the plastic material of said second and third plies being impermeable, the plastic material of said first ply being deformable when subject to a compressive force, said second ply including a plurality of indentations opening in a direction away from said third ply, first areas of said first ply between said indentations and said third ply being compressively deformed, second areas of said first ply being generally uncompressed or less compressed than said first area, said indentations open in a direction toward said end panel, said third ply being in hermetic sealing engagement with said sealing lip over the entire circumferential sealing area of the latter, said closure being secured to said container body under moderate axial load whereby portions of said indentations within said circumferential sealing area are open and upon excessive internal pressure within said container body said third ply of at least one of said first areas within said circumferential sealing area raises to break the hermetic seal and permit venting to atmosphere of the internal pressure.

4,089,435

TRANSPORTATION EQUIPMENT

Antoine Corompt, Saint Etienne, France, assignor to Bennes Marrel, France

Filed Dec. 14, 1976, Ser. No. 750,564
Claims priority, application France, Dec. 16, 1975, 75 39212
Int. Cl.² B65F *3/00*
U.S. Cl. 214—304 **19 Claims**



1. Transportation equipment comprising a vehicle and a removable container mountable thereon,

and at least one door enclosing the rear of said structure, said structure including means for locking said at least one door and means for opening said door;

an internal ejection plate movable the length of said structure; and

means for mechanically positioning said structure on said vehicle as said structure is placed thereon, said means for mechanically positioning including a rectangular member horizontally disposed at the front of said container, said rectangular member having an aperture centrally disposed therein and wherein said vehicle includes:

a horizontal loading platform having a longitudinal length and a lateral width for receiving said container;

a box-like structure centrally disposed at the front of said loading platform, said box-like structure having a base and surmounted on the front and both sides by oblique walls to form a guide funnel, said guide funnel cooperating with said means for positioning said container to automatically position said container as said container is placed on said loading platform;

a vertical pin fixedly disposed from said base and projecting upwardly, said vertical pin receivable into the aperture of said rectangular member to fixedly hold said container on said loading platform in longitudinal direction; and

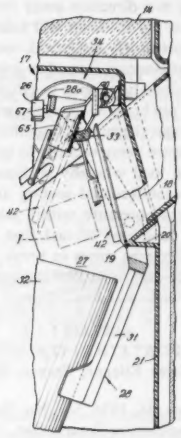
hydraulic means fixedly attached to the front end of said loading platform for moving said internal ejector plate in a longitudinal direction, said hydraulic means further operative to actuate said means for locking and said means for opening said at least one door.

4,089,436

REFRIGERATOR ICE DOOR MECHANISM

Edwin Morrison Marks, Evansville, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Aug. 26, 1976, Ser. No. 718,147
Int. Cl.[2] B67D *5/06*
U.S. Cl. 222—70 **11 Claims**



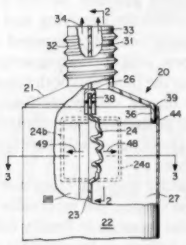
6. In an ice piece dispensing apparatus having means defining an opening, the improvement comprising: closure means continuously biased to block the opening substantially against free air flow therethrough while permitting ice pieces to move the closure means momentarily away from the opening against the biasing thereof to permit dispensing of the ice pieces; delivery means selectively operable to cause generally sequential delivery of ice pieces through said opening; force-applying means for effectively positively urging said closure means sealingly across said opening; and time delay means permitting said force-applying means to urge said closure sealingly across said opening only after a predetermined period of time subsequent to operation of said delivery means.

4,089,437

COLLAPSIBLE CO-DISPENSING TUBULAR CONTAINER

Raymond Allen Chutter; Paul James Green; Robert Lee Hofmann, and Daniel Rose Long, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 18, 1976, Ser. No. 697,517
Int. Cl.[2] B65D *35/24*
U.S. Cl. 222—94 **5 Claims**



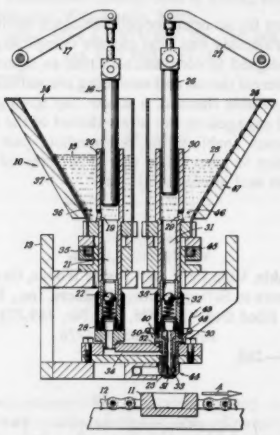
1. An improved collapsible tubular container for separately storing and co-dispensing two extrusible product components of substantially equal viscosity, the container including a collapsible tubular body, a head fitment having two discharge passageways which fitment is sealingly secured to one end of said body, and a longitudinally extending iterior bulkhead disposed to sealingly partition the interior of said container into two compartments, one of said compartments being in fluid communication with one of said discharge passageways and the other of said compartments being in fluid communication with the other of said discharge passageways, said improvement comprising a sufficiently pressure responsive moveable barrier means disposed adjacent only said one end and in fluid communication with both said compartments adjacent the interior ends of said discharge passageways, said pressure responsive moveable barrier means comprising a septum of material having a substantially greater degree of flexibility than said bulkhead, said septum being sufficiently moveable by such pressure differential as may be developed thereacross upon squeezing said container to effect co-dispensing to substantially vitiate said pressure differential whereby substantially constant proportion co-dispensing of said product components through said discharge passageways is assured during said squeezing because the components are under substantially equal pressures adjacent corresponding portions of said discharge passageways.

4,089,438

APPARATUS FOR MOLDING CONFECTIONERY HAVING HEAT-DISSIPATING NOZZLE

Gordon Steels, Peterborough, England, assignor to Baker Perkins Holdings Limited, United Kingdom

Filed Apr. 1, 1977, Ser. No. 783,950
Claims priority, application United Kingdom, Apr. 14, 1976, 15290/76
Int. Cl.[2] B67D *5/62*
U.S. Cl. 222—146 C **9 Claims**



1. In a dispenser for effecting simultaneous deposition of first and second confectionery materials into a mold arranged beneath said dispenser so as to form in the mold a deposit having a shell of the first material surrounding a filling of the second material, said dispenser comprising:

a first hopper for containing the first material;

a second hopper for containing the second material, said second hopper being physically separated from said first hopper;

a first heater for heating the first material in said first hopper;

a second heater for heating the second material in said second hopper, said second heater being independent from said first heater;

a nozzle assembly arranged beneath said hoppers, said noz-

zle assembly including an inner nozzle and an annular outer nozzle surrounding said inner nozzle;

a first conduit connecting said outer nozzle to said first hopper;

a second conduit connecting said inner nozzle to said second hopper, said second conduit being separate from said first conduit;

a first plunger mounted for reciprocating movement in said first hopper for causing discharge of the first material from said first hopper through said first conduit to said outer nozzle; and

a second plunger mounted for reciprocating movement in said second hopper for causing discharge of the second material from said second hopper through said second conduit to said inner nozzle;

said first plunger commencing discharge of the first material before said second plunger has commenced discharge of the first material after said second plunger has terminated discharge of the second material;

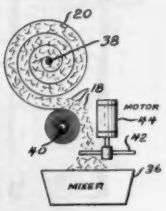
the improvement wherein said inner nozzle has an upper portion which projects upwardly from said nozzle assembly to provide a heat dissipating surface and wherein thermal insulation is associated with the portion of said inner nozzle beneath said heat dissipating upper portion.

4,089,439

APPARATUS FOR DISCHARGING FIBERS FROM BETWEEN THE CONVOLUTIONS OF A COILED WEB

William E. Dearlove, Washington, and Frederick S. Engelking, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 595,073, Jul. 11, 1975, Pat. No. 4,023,706. This application Feb. 7, 1977, Ser. No. 766,188
Int. Cl.² B65B 9/00; E04C 5/01
U.S. Cl. 222—167 **6 Claims**



1. Apparatus for dispensing fibers for use in the making of fibrous concrete comprising:

a package of concrete reinforcing fibers comprising a spirally wound, elongated web of flexible material and a uniform layer of reinforcing fibers disposed between the convolutions of the web and contained thereby, said fibers being unattached to said web;

a support device located generally concentric with the spiral axis of said web and comprising a spindle mounting said web;

a pair of spaced frame members each having means rotatably and removably receiving the spindle of the package and adapted to be located over a means for receiving the fibers;

means for rotating a spindle received in said receiving means, including an easily releasable rotary drive connection for connection to the spindle;

a web takeup shaft journalled by said frame members below said receiving means; and

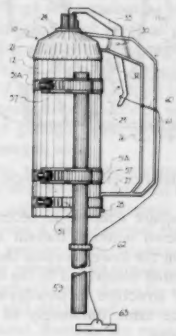
means for rotating said takeup shaft.

4,089,440

HANDLE SUPPORT AND OPERATING ASSEMBLY FOR AEROSOL SPRAY CANS

Edward Lee, 12 Bonavista Place, Winnipeg, Canada

Filed Jul. 1, 1976, Ser. No. 701,571
Int. Cl.² B65D 83/14
U.S. Cl. 222—174 **10 Claims**



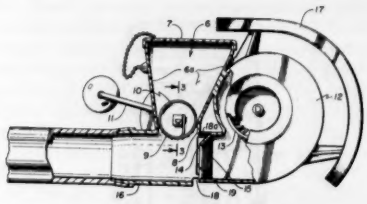
1. A handle support and operating assembly for aerosol spray cans which include a substantially domed top portion, an upstanding lip between said top portion and the remainder of the can, a cylindrical spray button assembly situated centrally within said domed top portion and a spray button and dispenser extending upwardly from said spray button assembly; said handle support and operating assembly comprising in combination a centrally apertured, top portion engaging component and a handle extending downwardly from one side thereof, means to snap engage said component with said cylindrical spray button assembly, a trigger pivotally mounted in said handle and having an actuating end and a spray button engaging end, and a shroud surrounding the aperture in said top portion engaging component and extending upwardly from said component with said spray button and dispenser being surrounded by said shroud when said assembly is engaged upon the spray can, said shroud being moveable from a trigger operating position to a trigger locked position and vice versa, said spray button engaging end of said trigger, when said shroud is in said trigger operating position, being engageable with said spray button to depress same when said trigger is actuated by said operating end, said shroud being cylindrical and mounted for partial rotation upon said component and surrounding said aperture, the wall of said shroud having a slot therein selectively engageable by the spray button engaging end of said trigger, and a dispenser slot formed in said shroud diametrically opposite to said first mentioned slot whereby, when in said trigger operating position, said spray button engaging end of said trigger can depress said spray button and dispenser and the contents of the can are thereby dispensed through said dispenser slot, and when said shroud is in the trigger locked position, the upper edge of said shroud prevents said spray button engaging end of said trigger from depressing said spray button and dispenser and said spray button and dispenser is shrouded by the wall of said shroud and additional means to support the spray can within said component, said additional means including an annular bead formed around the inside of the lower edge of said component snap engaging over the said upstanding lip of said spray can.

4,089,441

PORTABLE MANUALLY OPERATED DUSTER

John M. Cole, and Ruth E. Cole, both of 2715 Elmwood Ave., Sioux Falls, S. Dak. 57105

Filed May 24, 1976, Ser. No. 689,132
Int. Cl.[2] A01C *15/02, 15/04;* B05B *7/00*
U.S. Cl. 222—193 4 Claims



1. A portable manually operated domestic type duster comprising:

(a) a chamber structure adapted to receive and contain a supply of powdered material therein and having a discharge opening in the lower portion thereof;

(b) a discharge conduit connected to the discharge opening of said chamber structure in powder-receiving relation and directing the same outwardly in a predetermined direction therefrom;

(c) blower means connected to said chamber structure and having a relatively restricted air discharge connected to said discharge conduit immediately adjacent to and behind the discharge of said chamber structure and directing air past and away therefrom;

(d) a concave wire screen panel secured to said chamber structure and extending across the discharge opening thereof;

(e) a cylindrically shaped spirally extending wire agitator mounted for rotation within said chamber structure above and across said screen material and in engagement with the upper concave surface thereof;

(f) manual crank means rotatably mounted on said chamber structure and drivingly connected to said agitator and said blower means for rotating the same whereby upon operation thereof, powdered material will be metered into the air flow directed outwardly through said discharge conduit by said blower means and distributed thereby; and

(g) said discharge conduit having air-admission openings therein located between said discharge opening of said chamber structure and said air discharge of said blower means.

4,089,442

ACCUMULATIVE PRESSURE PUMP

Robert X. Hafele, and Lewis C. LoMaglio, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Sep. 30, 1976, Ser. No. 728,212
Int. Cl.[2] G01F *11/06*
U.S. Cl. 222—321 22 Claims

1. A finger-operated pump assembly comprising:

a. compression chamber means;

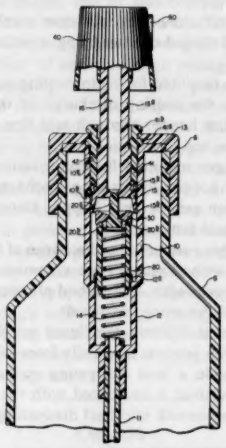
b. cylinder means connected to said compression chamber means;

c. primary piston means slidably fitted inside said compression chamber means, said primary piston means having primary liquid flow passage means;

d. secondary piston means slidably fitted inside said compression chamber means and said cylinder means, said secondary piston means having secondary liquid flow passage means;

e. resilient means fitted inside said secondary piston means and inside said cylinder means to urge said secondary piston means towards said primary piston means;

f. first valve means rigidly connected to said secondary piston means for contacting said primary liquid flow passage means to stop the flow of liquid from said compression chamber means through said primary liquid flow passage means; and,



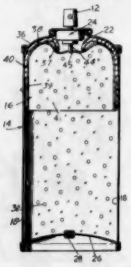
g. secondary valve means for preventing back flow of liquid through said secondary liquid flow passage means.

4,089,443

AEROSOL, SPRAY-DISPENSING APPARATUS

Nicolaus H. Zrinyi, 3438 W. 75th St., Los Angeles, Calif. 90043

Filed Dec. 6, 1976, Ser. No. 748,240
Int. Cl.[2] B65D *83/14*
U.S. Cl. 222—386.5 1 Claim



1. An aerosol, spray-dispensing apparatus of the type having a neutral, pressurized, gas propellant disposed therein to impart a force to discharge stored ingredients therein, said apparatus comprising:

an outer container having a sealed pressured chamber defined thereby; a discharge valve means secured to the upper ends of said outer container to discharge said stored ingredients therein;

means provided in said outer container to charge said gas propellant into said pressure chamber;

an inner container arranged to be disposed in said pressure chamber;

said inner container comprising an upper, semi-rigid body forming an inverted cup member having a central opening therein to receive said discharge valve means therein, said upper body of said inner container conforming to the inner surface of the outer container, whereby opposing surfaces thereof engage each other to prevent said propellant from being disposed therebetween;

a lower, flexible bag member attached to said upper body,

wherein said upper body and said lower bag member define a chamber to store said ingredients therein for discharge through said valve means, said ingredients being isolated from said gas propellant;

said upper body member of said inner container comprising:

a dome member wherein said central opening is located,

an annular, depending wall arranged to fit in a sealing manner, against said inner surface of said outer container, whereby pressurized gas is prevented from passing therebetween,

an annular recess formed in the lower, depending end of said annular wall to receive said flexible bag for securement thereof to said upper body member, said bag being exposed to said pressurized gas whereby said bag is allowed to collapse when said valve is operated for discharge of said ingredients, said bag being arranged to be received in said inverted cup member for total displacement of said ingredients stored therein;

means to provide charging of said gas propellant into said pressure chamber, said means comprising a valve plug disposed in the bottom of said outer container;

means for affixing said inner container to said outer container;

puncture means affixed to said discharge valve means, whereby said flexible bag portion is punctured thereby after total discharge of said ingredients therein, to allow said pressurized gas to be released from said pressure chamber of said outer container.

4,089,444

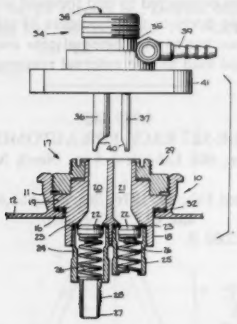
TAPPING APPARATUS FOR GOLDEN GATE TYPE BEER KEG OPENINGS

Ronald E. Shea, 643 Oxford Rd., Oxford, Conn. 06483

Continuation of Ser. No. 449,712, Mar. 11, 1974. This application Jan. 10, 1977, Ser. No. 758,202

Int. Cl.² B65D *83/00*

U.S. Cl. 222—400.7 **5 Claims**



1. A tapping apparatus for beer kegs having a golden gate type dispensing opening, said opening consisting of an annular stepped sleeve integrally formed with said keg and including a reduced diameter opening at the axially inner end thereof communicative with said keg, an internally threaded portion at the axially outer end thereof, and an intermediate diameter internal smooth bore portion disposed therebetween, said smooth bore portion and said reduced diameter opening defining therebetween an annular shoulder at the axially inner end of said sleeve, the tapping apparatus comprising:

a removable keg unit, adapted for slidable disposal into said keg, comprising a stepped annular member including a plurality of external smooth bore portions of different diameter disposed axially along said member and an annular flange disposed thereon between selected one of said portions, said annular member having a diameter at one end thereof for insertion into said keg which is less than the diameter of said reduced diameter opening, said annular flange having a diameter less than that of said intermediate smooth bore portion of said sleeve, with the axially outer end of said annular member having a diameter less than that of said threaded portion of said sleeve and forming a stepped annular space therebetween, said annular flange adapted for movement into sealing engagement toward said annular shoulder, sealing means disposable between said flange and said shoulder to provide a fluid tight seal for said keg unit in said dispensing opening, said keg unit further comprising a liquid passage extending axially therethrough and terminating in an axial opening at each end for draining beer externally of said keg, a gas passage extending axially therethrough and terminating in an axial opening at each end for admitting gas to the interior space of said keg, said liquid passage opening and gas passage opening disposed side by side and valve means disposed in said gas and liquid passages for opening and closing said passages; and

a separate stepped annular coupling member, including a smooth annular stepped bore, adapted for slidable disposal over said keg unit and engagement with said annular flange, and having a first external threaded portion for disposal in said annular space between said annular sleeve and said annular member and engagement with said internal threaded portion of said sleeve for removably securing said keg unit in said sleeve, and a second external threaded portion of reduced diameter for engagement with a keg tapping unit, said keg unit being adapted to be held stationary with respect to said keg opening during tightening of said coupling member.

4,089,445

FUEL FILLING SYSTEM

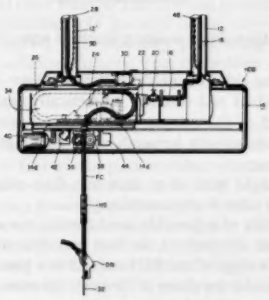
Hiyoshi Tatsuno, Tokyo, Japan, assignor to Tokyo Tatsuno Co., Ltd., Tokyo, Japan

Filed May 14, 1976, Ser. No. 686,439

Claims priority, application Japan, Aug. 14, 1975, 50-98138

Int. Cl.² B67D *5/12*

U.S. Cl. 222—538 **11 Claims**



1. A nozzle suspended type fuel filling apparatus for dispensing fuel to motor vehicles in a fuel filling service area, comprising an underground fuel reservoir, an elongated hollow body arranged above said fuel filling service area and being of a sufficiently large size to serve as a guide for approaching motor vehicles and thereby define the fuel filling service area, a stationary conduit extending from said underground reservoir to said elongated hollow body, pumping means for pumping fuel from said underground reservoir through said stationary conduit, means dividing said elongated hollow body into an upper compartment and a lower compartment, said lower compartment having a bottom wall with an elongated opening therein, a flexible conduit accommodated in said upper compartment, said flexible conduit having one end portion connected to said stationary conduit and having its other end portion passing from said upper compartment through said

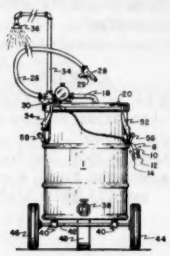
lower compartment and exiting through said elongated opening in said bottom wall of said lower compartment, a nozzle means for dispensing fuel connected to the free end of said other end portion of said flexible conduit, operating means in said lower compartment for engaging said flexible conduit for raising and lowering the flexible conduit to thereby withdraw the flexible conduit from said upper compartment during fueling of motor vehicles and to retract the flexible conduit into said upper compartment for accommodating the retracted flexible conduit upon completion of fueling, and slidable means slidably mounted in said lower compartment, said operating means being mounted on said slidable means such that manual pulling of said flexible conduit in the longitudinal direction of said elongated body will effect sliding movement of said operating means as the flexible conduit transverses said elongated opening in the bottom wall of said lower compartment.

4,089,446

PORTABLE WATER SUPPLY AND DISBURSING UNIT

James H. Logan, II, 9943 Shoshone Way, Randallstown, Md. 21133, and Richard J. Logan, Jr., 6504 Freedom Ave., Sykesville, Md. 21784

Continuation of Ser. No. 584,882, Jun. 9, 1975, abandoned. This application Sep. 17, 1976, Ser. No. 724,227
Int. Cl.[2] A01C *19/00*
U.S. Cl. 222—609 **2 Claims**



2. A portable vehicle washing machine comprising in combination:

a. a circular-sided drum-like water container having at least one circular end member hermetically sealed to at least one end of the circular-sided water container and in a plane substantially perpendicular to the said circular-sided container;

b. a flat rigid base of an area less than either end of the circular sided water container;

c. a plurality of adjustable arms having one end of each of the arms attached to the base and extending outwardly from the edge of the flat base and in a plane substantially parallel with the plane of the base, the outer ends of which extend beyond and downwardly over the upper end of the circular side of the water container for engaging said upper end of the container side;

d. the downward extended end engaging means on the outer end of each arm are adapted to compressibly engage said upper end of the container side and means associated with at least one of the end engaging means for reducing the distance between the clamping elements to compressibly clamp the base to said upper end of the container side;

e. a water pump having water intake and outlet openings therein, and a low voltage motor for operating said pump secured to the base;

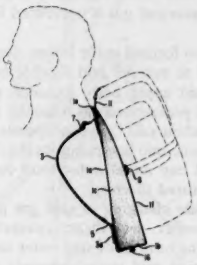
f. means connected with the inlet opening of the pump adapted to extend to a point adjacent the bottom of the drum for supplying water to the pump, and flexible means connected to the outlet opening in the pump to supply water under pressure to a nozzle.

4,089,447

BACK PACK DEVICE

Hans Wano Achmeteli, 400 Sherwood Rd., Union, N.J. 07083

Filed Jul. 5, 1977, Ser. No. 812,999
Int. Cl.[2] A45F *3/10*
U.S. Cl. 224—25 A **12 Claims**



1. A separate back pack support for carrying a load on the back of a wearer which comprises in combination:

a resilient cushion-like body having a substantially planar forward major surface constructed for contact with the back of the wearer, and a substantially planar external rear major surface constructed to be secured to the load,

said forward and rear major surfaces being disposed to one another at an acute angle of approximately 25° to 30° in a vertical plane normal to said surfaces whereby the cross-section of said body in said plane is substantially triangular, the narrow cross-sectional top portion of said body constructed to be in contact with the shoulders of the wearer, and the broad cross-sectional bottom portion of said body constructed to be in contact with the lower back of the wearer,

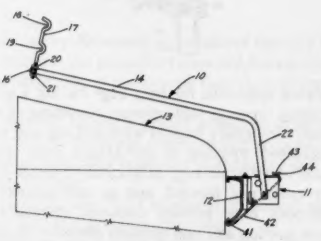
shoulder straps connected to said forward major surface for securing said body to the shoulders of said wearer, and, means connected to said external rear major surface for securing said load to said external rear major surface.

4,089,448

BICYCLE-SKI RACK FOR AUTOMOBILES

John L. Traeger, 608 Lakeview Ave., North Mankato, Minn. 56001

Filed Feb. 26, 1976, Ser. No. 661,697
Int. Cl.[2] B60M *9/10*
U.S. Cl. 224—42.03 B **11 Claims**



1. An automobile-mountable rack for carrying lightweight vehicles, said rack comprising:

A. a pair of brackets adapted to be clamped horizontally spaced apart on the rear bumper of an automotive passenger vehicle, each of said brackets comprising

1. a top horizontal plate having a lip at its forward end, said lip being engageable with the top inner edge of a bumper,

2. a first vertical plate extending downwardly from the top plate and longitudinally therewith,
3. a further transverse vertical plate at approximately a right angle to said first vertical plate intermediate between the ends of said top plate,
4. an elongated vertical bumper-engaging clamping member extending downwardly from said top plate between said lip and transverse plate and adjustably mounted for limited movement therebetween,
5. screw clamping means supported in said transverse plate and engageable with said clamping member,
6. horizontal pivot means supported by said first vertical plate and spaced downwardly from said top plate, and
7. stop means disposed on at least the side of said pivot means between the pivot and bumper,

B. a frame pivotally supported in said brackets, said frame comprising

1. a pair of generally parallel side members,
2. an end member connecting said side members at one end, and
3. a pair of angular extensions at the opposite ends of said side members, a transverse passage through each of the extensions adjacent the ends thereof, one of said passages engaging the pivot means of one of said brackets, the other of said passages engaging the pivot means of the other of said brackets, said extensions being engageable with said bracket stop means adjacent to but spaced from said pivot engaging passages whereby said frame is held spaced from the trunk lid of the automobile on which the rack is mounted such that said side members and end member overlie the rear deck of the trunk lid, and

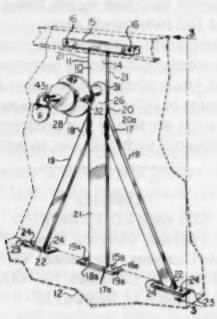
C. lightweight vehicle supporting means mounted on said frame.

4,089,449

SPARE TIRE MOUNT DEVICE

Ralph H. Bayne, 54710 N. Ave., Mt. Clemens, Mich. 48043, and Vestel Fields, 14725 Tacoma St., Detroit, Mich. 48205

Filed Dec. 18, 1975, Ser. No. 642,149
Int. Cl.[2] B62D *43/08*
U.S. Cl. 224—42.24 **1 Claim**



1. A specialized tire rim mount for a pick-up truck having a box including a pair of sidewalls and a floor, each said sidewall having an upper flanged edge portion, a spare tire wheel and rim retaining means having a support member adapted to be fixedly fastened to a wheel and rim mount foundation, the improvement in the means for securing said wheel and rim mount in a torsion and torque resisting relationship to said retaining means, said improvement comprising:

the combination of a trunk means including a vertical substanially straight elongated trunk member constructed of heavy gage flat steel strip stock arranged and adapted to extend generally from the trunk bed of the box substantially to the top of the truck box with the outward flat side of said member arranged generally parallel to the side of said box, said trunk member having a generally elongated shoe member rigidly and fixedly mounted transversely to the top end of said trunk member in the general outline of a "T" having spaced fastening elements adapted to mount said shoe member fixedly beneath the upper flanged edge portion of said pick-up truck box for fixedly fastening the top end of said trunk member to the upper flanged edge portion of said pick-up truck box;

a pair of substantially equal length torsion resisting diagonally spaced brace portions constructed of heavy gage flat steel strip stock fixedly and rigidly fastened edgewise at their top ends to the vertical side walls of said trunk member generally planar with said trunk member and substantially equidistant from and adjacent to said top of said trunk member, said brace portions extending diagonally from said trunk member to said pick-up box floor at a generally 45° included angle with each of said brace portions having a generally flat rectangularly outlined shoe member fixedly attached horizontally to the bottom end of each brace portion for fixedly attaching said brace shoe member flush to the bed of said trunk box, said rim retaining support member being attached at its free end fixedly, contiguously, and rigidly to the inward side of said trunk member adjacent the upper ends of said brace portions and a sufficient distance from the bottom of said trunk member and the box floor so that a truck tire will substantially clear the floor when mounted on said retaining means;

cantilevered tire rim supporting means including an annular cantilevered heavy gage tubular stub arm portion having a flatted tube end portion fixedly, contiguously, and rigidly mounted to the inward side of said trunk member and a flatted inwardly directed tube extremity;

an annular tire mounting means including a generally flat, heavy gage steel mounting plate member generally centrally fixedly and rigidly fastened contiguously to said inner directed extremity of said arm stub adjacent to said top ends of said side braces and at least two mounting stubs fixedly, rigidly, and radially mounted on said inward face of said plate member cantilevered inwardly to accept the rim mounting hole spacings of the conventional tire herein involved, said mounting plate being located upwardly a sufficient distance from the bottom of said trunk member so that said tire will substantially clear the bed of the truck box;

and a steel rim mounting starter extension and locking bar member cantileveredly mounted fixedly and rigidly to said inward face of said plate member substantially axially to said stub arm member, the inward tip of said bar member extending inwardly substantially farther than the free extremities of said stud members so that the tire may be rested on said bar to assist in locating the tire rim holes over said stud members, said bar member having a bore at the free extremity thereof for receiving a locking device.

4,089,450

MANUAL FILM RETRIEVAL

Richard H. Koester, Rochester, N.Y., assignor to The Singer Company, New York, N.Y.

Filed Jan. 10, 1977, Ser. No. 758,276
Int. Cl.[2] B65H *17/26*; G03B *21/00*
U.S. Cl. 226—127 **9 Claims**

7. Apparatus for causing longitudinal displacement of a filmstrip in a filmstrip guide and support means comprising:

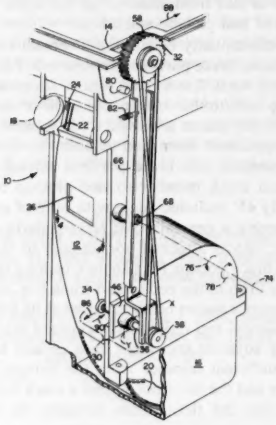
a roller for frictional engagement with a filmstrip;

an axle having one end secured to said roller for rotation therewith;

bearing means rotatably supporting said axle intermediate its ends;

said bearing means permitting said axle angular degrees of freedom;

a first pulley secured to the other end of said axle for rotation therewith;
a lever pivoted intermediate its ends;
a rotatably mounted thumb wheel at a first end of said lever;
a second pulley connected to said thumb wheel for rotation therewith;
the second end of said lever embracing said axle;



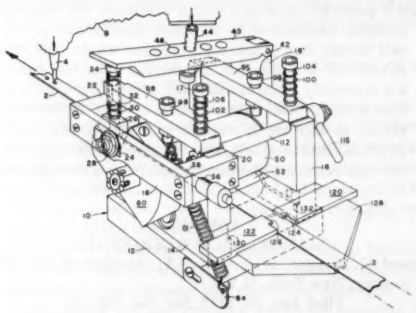
belt transmission means coupling said first pulley and said second pulley;
whereby a tangential force applied to said thumb wheel causes said lever to pivot to angularly displace said axle to bring said roller into engagement with said filmstrip, with rotation of said thumb wheel causing rotation of said roller to translate said filmstrip.

4,089,451

AUTOMATIC STRIP-FEEDER DEVICE PARTICULARLY FOR DIES

Eliyahu Zlaikha, Raziel Street 39, Netanya, Israel

Filed Oct. 4, 1976, Ser. No. 729,150
Claims priority, application Israel, Oct. 3, 1975, 48233
Int. Cl.[2] B65H *17/22, 17/44*
U.S. Cl. 226—136 **8 Claims**



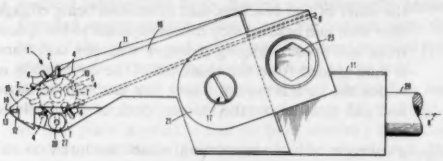
1. A strip feeder comprising: a drive roller engagable with one face of the strip for driving same; an idler roller engagable with the opposite face of the strip; a fixed frame supporting both said rollers; a spring-urged hammer bar pivotably mounted to the frame so as to be pivoted by an impact during a forward stroke and to be spring-returned upon termination of the impact during the return stroke; a displaceable member displaceable in a first direction by the hammer bar during said forward stroke thereof upon receiving an impact; a spring connected to the displaceable member to be loaded when it is displaced during the forward stroke, and to return the displacement able member during the return stroke after termination of the impact; a first one-way clutch between the drive roller and the displaceable member and effective to decouple the drive roller from the displaceable member during the forward stroke thereof and to couple the drive roller to the displaceable member during said return stroke; and a second one-way clutch between the idler roller and the frame and effective to couple the idler roller to the fixed frame during the forward stroke of the displaceable member to prevent the movement of the strip, and to decouple the idler roller from the frame during the return stroke of the impact member to permit its being fed by the drive roller.

4,089,452

ORIENTATION APPARATUS FOR MULTIPLE TWISTED WIRES

David Erle Houser, Apalachin, and Richard Jay Morenus, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 16, 1977, Ser. No. 797,276
Int. Cl.[2] B65H *17/22*
U.S. Cl. 226—157 **10 Claims**



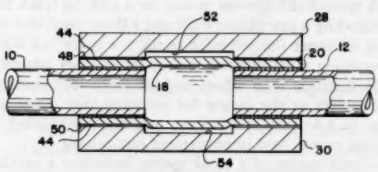
1. Apparatus for orienting plural twisted wires, said twisted wires having N twisted sections per full-twist pitch of said twisted wires, where N is a predetermined constant integer greater than one, the combination comprising:
roller means,
plural seat means disposed in a predetermined circumferential manner about said roller means, each of said seat means having a conformal configuration compatible to the configuration of a said twisted section, the arcuate spacing between adjacent said seat means being correlated with 1/Nth of said full-twist pitch, and
ratchet means associated with said roller means for indexing of said roller means in rotational increments correlated to said full-twist pitch whereby said wires are fed out from said roller means in full-twist linear increments whenever said twisted wires are seated in a predetermined operative feeding relationship with said seat means.

4,089,453

SOLDERED TUBE END

William Bernard Jenkins, Henrico County, Va., assignor to Reynolds Metals Company, Richmond, Va.

Filed Apr. 30, 1976, Ser. No. 681,908
Int. Cl.[2] B23K *1/18*
U.S. Cl. 228—154 **8 Claims**



1. A method of forming a tight soldered joint between a first hollow cylindrical member and a second cylindrical member,

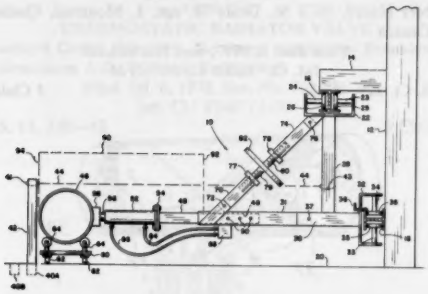
the first cylindrical member having an inner cylindrical surface loosely overlapping and coaxial with an outer cylindrical surface of the second cylindrical member, comprising the steps of precoating at least one of said surfaces with solder, heating the soldered surface to the melting temperature of the solder, and, while maintaining said melting temperature, simultaneously swaging down the said first cylindrical member to reduce the diameter thereof and bring its said inner surface into an interference fit with said outer surface of said second cylindrical member, and while performing said swaging operation simultaneously further moving one of said cylindrical members relative to the other to cause said surfaces to slide against each other, thereby tending to penetrate the surfaces to expose bare metal to the molten solder.

4,089,454

APPARATUS FOR AND PROCESS OF FABRICATION OF ELONGATED AND CYLINDRICAL STRUCTURES

J. D. Hampton, Tulsa, Okla., assignor to John Zink Company, Tulsa, Okla.

Filed Jan. 21, 1977, Ser. No. 761,396
Int. Cl.² B23K *31/06*
U.S. Cl. 228—173 A **7 Claims**



1. The method of fabricating long circular cylindrical shells out of two short cylindrical shells, of substantially the same diameter, comprising the steps of;

(a) placing said shells on a means for holding the two shells in abutting relation, and substantially coaxial;

(b) relatively rotating one shell with respect to the other to match whatever out-of-roundness exists;

(c) if the diameter of one shell is greater than that of the other in a common first diametral plane, applying a force in said first plane to reduce said greater diameter, until the diameters of both shells in said plane are substantially the same;

(d) tack welding the two shells at the ends of the diameter in said first plane;

(e) rotating the shells together until a second diametral plane is found where the diameter of one shell is larger than that of the other, and applying force in said second plane to said one shell to reduce its diameter to that of the other, and tack welding the two shells at the ends of the diameters in said second plane;

(f) repeating step (e) until the two shells have substantially the same diameters in all diametral planes; and

(g) girth welding the butt joint between the two shells.

2. Apparatus for fabricating long circular cylindrical shells out of at least two short shells of the same diameter, comprising;

(a) a nominally horizontal boom; moveably supported at a first end to a first wall;

(b) means to adjust the length of said boom;

(c) means to tilt said boom up and down from said nominal horizontal position;

(d) means to support said boom so that it can be moved horizontally in a direction perpendicular to its length;

(e) colinear hydraulic means at the second end of said boom to extend its length incrementally;

(f) means to support two circular cylindrical shells, nominally of the same diameter in a coaxial position, with ends abutting; and means to rotate said shells independently about their common axis;

(g) a second wall parallel to said first wall and spaced from the second end of said boom by a selected distance, both walls above to resist substantially horizontal forces tending to force them apart;

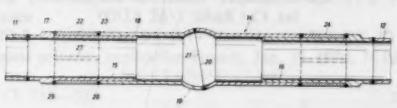
whereby when at least one of said shells is placed between said second wall and said hydraulic means on said second end of said boom, said hydraulic means can exert a horizontal force on said shell to reduce its horizontal diameter.

4,089,455

APPARATUS AND METHOD FOR CONNECTING PIPES BY WELDING

Gary A. Fellers, Montrose, Scotland, assignor to HydroTech International, Inc., Houston, Tex.

Filed Apr. 25, 1977, Ser. No. 790,464
Int. Cl.² B23K *31/06*
U.S. Cl. 228—178 **4 Claims**



1. A pipe connection joining axially spaced apart relatively misaligned pipes, comprising:

a pair of tubes, each of which has a radially outwardly enlarged ring near one end thereof, which end is butt welded to the end of one of said pipes;

a pair of coupling members, each of which has a tubular portion telescopically mounted over one of said tubes, and each has an end portion having a face butt welded to the face of the other end portion, wherein each of said faces lies on a plane which intersects the axes of said tubular portions at a nonperpendicular angle and describes a circle upon said plane; and

a pair of axially split sleeves, each of which is butt welded between one of said rings and the end of one of said tubes, wherein the split portions of each of said sleeves are butt welded together.

4,089,456

CONTROLLED-PRESSURE DIFFUSION BONDING AND FIXTURE THEREFOR

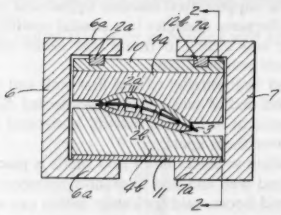
Harvey R. Toppen, East Hartford; Joseph F. Loersch, Bolton; Daniel F. Paulonis, Moodus, and O. Preston Lowrey, Jr., Madison, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jun. 28, 1977, Ser. No. 810,692
Int. Cl.² B23K *19/00*
U.S. Cl. 228—195 **9 Claims**

1. In a fixture for holding workpiece surfaces in opposed contacting relation and exerting pressure on said surfaces for diffusion bonding, wherein the pressure is generated by components of the fixture expanding differentially upon heating to the bonding temperature, the improvement comprising pressure-controlling means disposed between the components of the fixture for insuring sound bonding across the workpiece surfaces without distortion of said surfaces or fixture components, said means including:

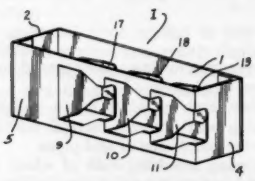
at least one shim member made of a preselected material and having a preselected load-bearing, cross-sectional geometry substantially normal to the direction of pressure such that the shim member is selectively and controllably de-

formed during heating by the differentially expanding components to control the bonding pressure at the desired



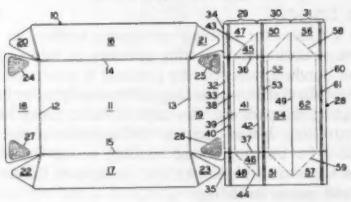
value and prevent unwanted distortion of the workpiece surfaces and fixture components.

4,089,457
PACKAGING INSERT
Prentice J. Wood, Hapeville, and Robert E. Plaxico, Lithonia, both of Ga., assignors to The Mead Corporation, Dayton, Ohio
Filed Jul. 6, 1977, Ser. No. 813,336
Int. Cl.[2] B65D *5/48, 85/00*
U.S. Cl. 229—15 **5 Claims**



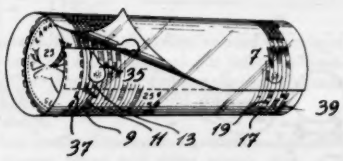
1. A packaging insert comprising a pair of spaced side walls, a pair of end walls with the sides thereof secured respectively to the ends of said side walls, a transverse partition secured at each end thereof respectively to said side walls and extending therebetween, and a pair of auxiliary panels disposed in face contacting relation to each other and joined respectively to one end of one of said side walls and to the adjacent end wall, said pair of auxiliary panels being foldably joined to each other.

4,089,458
BLANK FOR COMPARTMENTALIZED TRAY
George Leroy Meyers, and Donald Roy Kuehl, both of Menasha, Wis., assignors to American Can Company, Greenwich, Conn.
Filed May 12, 1977, Ser. No. 796,183
Int. Cl.[2] B65D *5/48, 5/28*
U.S. Cl. 229—32 **2 Claims**



1. A paperboard tray blank comprising:
(a) a rectangular bottom panel defined by first and second side score lines and a pair of primary end scores lines;
(b) a pair of end walls hingedly connected to said bottom panel respectively along said primary end score lines;
(c) first and second side walls hingedly connected to said bottom panel respectively along said first and second side score lines, said second side wall having an upper edge opposite said second side score line;
(d) four corner tabs for connecting said end walls and side walls together to form a tapered tray body;
(e) a first divider panel having a main portion hingedly connected to the upper edge of said second side wall along a breakaway line of weakness and having a pair of end portions hingedly connected to said main portion along a pair of secondary end score lines which are substantially aligned respectively with said primary end score lines;
(f) the main portion of said first divider panel having an attachment section defined by said pair of secondary end score lines and a fold line and having a partition section hingedly connected to said attachment section along said fold line; and
(g) the end portions of said first divider panel having a pair of biased fold lines dividing the end portions into substantially triangular web sections and end glue sections.

4,089,459
COIN WRAPPER
Albert Huard, 6676 St. Denis St. apt. 1, Montreal, Quebec, Canada
Filed Jun. 6, 1977, Ser. No. 804,128
Int. Cl.[2] B65D *65/10, 65/16*
U.S. Cl. 229—87.2 **3 Claims**

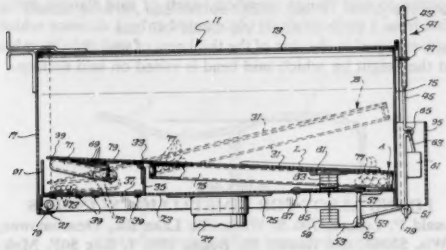


1. A coin wrapper comprising a sheet of transparent flexible material, a pair of studs formed near one end of said sheet on one face thereof, each stud being terminated by an enlarged head, four substantially spherical depressions for each stud, each of said depressions having a rim in the opening, said rim to hold one of said heads firmly into said depression after snapping one of said studs into one of said depressions said four depressions for each stud being all in line with said stud, said depressions being adapted to engage said studs to form a cylinder with four diametrical dimensions so that said cylinder is capable of holding pennies, nickels, dimes or quarters, and means to cause tearing of the material surrounding each of said studs upon trying to unsnap said coin wrapper.

4,089,460
MAILBOX SIGNAL
George K. Mellard, R.D. 2, Box 63 Duerer St., Egg Harbor City, N.J. 08215
Filed Apr. 15, 1976, Ser. No. 677,397
Int. Cl.[2] B65B *91/00*
U.S. Cl. 232—34 **9 Claims**

1. A signaling device for indicating the presence of mail in a rural-type mailbox having a horizontal bottom and an end door with which said device has no operative cooperation, said device comprising: a generally horizontal plate in said mailbox adapted to support mail placed in said mailbox, said plate being adjacent to said bottom; pivot means, adjacent said door, for pivotally supporting said plate for movement about a horizontal axis extending crosswise of said mailbox, said plate extending rearwardly substantially to the rear end of said mailbox whereby it normally assumes a stable position in which it

slopes downwardly toward the rear end thereof; movable means carried on the lower surface of said plate adapted in one position to hold said plate in said stable position and shiftable, when said plate is inclined downwardly toward its front, to

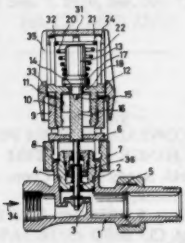


bias said plate to said lattermentioned position; a signal target wholly without said mailbox and movable from a non-signaling position to a signaling position; and means responsive to pivotal movement of said plate to said stable position for moving said target to signaling position.

4,089,461
THERMOSTATIC RADIATOR VALVE

Eberhard Gocke, Mosbach, Germany, assignor to Braukmann Armaturen A.G., Rothrist, Switzerland

Filed Jul. 6, 1976, Ser. No. 702,772
Int. Cl.[2] F24F *11/00*
U.S. Cl. 236—42 **6 Claims**



1. A thermostatic radiator valve having in combination an apertured housing, a valve seat in said housing, a valve plate engageable with said valve seat, a valve stem having one end secured to said valve plate with the other end extending outwards of said housing through said aperture in said housing, a spring loaded thermostat operable against said other end of said valve stem and a rotatable member having means for sealing securement to said housing at said aperture, said spring bearing against thermostat and said rotatable member characterised in that the latter has resilient arms surrounding said thermostat concentrically with each of said arms having, at least partly in the vicinity of its free end a radially inwardly projecting extension against which bears said spring.

4,089,462
TEMPERATURE CONTROL SYSTEM INCLUDING K-FACTOR ADJUSTMENT

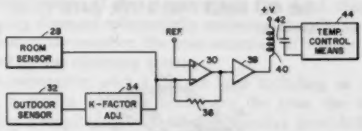
George J. Bradford, York, Pa., assignor to International Telephone & Telegraph Corporation, Nutley, N.J.

Filed Feb. 19, 1976, Ser. No. 659,399
Int. Cl.[2] G05D *23/30*
U.S. Cl. 236—68 B **22 Claims**

1. A system adapted for use in controlling the temperature of an environment within an enclosure, comprising:

means for selecting a temperature set point for said environment and for initiating a temperature control signal when the temperature of the environment is at a temperature control point; and

means for automatically shifting the temperature control point in accordance with the ambient temperature and a

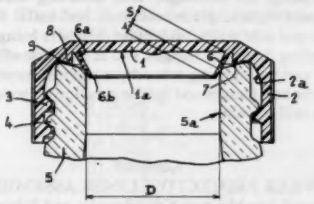


K-Factor of the enclosure, whereby the system may be adjusted to automatically compensate for the heat transfer characteristics of a particular enclosure in which it may be used thereby eliminating an excessive environmental temperature change before heating or cooling is called for.

4,089,463
SCREW CAPS

Pierre Babiol, Villefranche-sur-Saone, France, assignor to Societe Nouvelle de Bouchons Plastiques S.N.B.P., Paris, France

Filed Jan. 14, 1977, Ser. No. 759,608
Claims priority, application France, Jan. 28, 1976, 76 02855
Int. Cl.[2] B65D *41/04*
U.S. Cl. 215—329 **3 Claims**



1. An elastic deformable screw cap for a container having a neck with external threads and having a bore extending through the upper end surface of the neck, the cap comprising:

a base portion having an inner surface facing toward said neck;

a flexible truncated conical lip extending downwardly from a root portion where it joins said inner surface of the base portion and converging toward a smaller free end of lesser diameter than said bore;

an annular abutment comprising multiple concentric ribs extending downwardly from the inner surface of the base portion toward the upper surface of the neck and surrounding said root portion and spaced therefrom, the concentric ribs extending lesser distances than said lip from said inner surface of the base portion and respectively extending to decreasing extents away from the root of the lip; and

a skirt portion joining said base portion at its upper end and having internal threads adjacent to its lower end for engaging the threads on said neck, the skirt portion having a cross-sectional portion extending from the base portion to said internal threads along an inner surface which curves smoothly outwardly and downwardly from the outer concentric rib along an inner surface which is a portion of an ellipse and joins said internal threads at a distance below the free end of the lip at least equal to the height of the lip, said curved cross-sectional portion being deformable inwardly toward the neck when the skirt portion is tensioned by screwing the cap tightly on the neck.

4,089,464

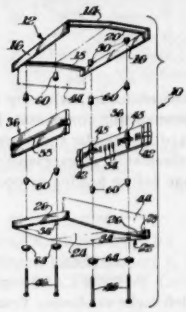
INSTRUMENT HOUSING

Joseph A. Teti, Jr., Merion, and Peter A. Peroni, Pottstown, both of Pa., assignors to LaFrance Precision Casting Company, Philadelphia, Pa.

Filed Sep. 30, 1976, Ser. No. 728,243

Int. Cl.[2] B65D *7/00, 25/28;* **A47B** *95/02*

U.S. Cl. 220—4 A **31 Claims**



1. An instrument housing comprising a molded top wall, a molded bottom wall, a pair of opposed molded side walls slidably connected to said top wall and said bottom wall to form a hollow casing, fastening means securing said top wall to said bottom wall, vertical guide members having axial openings extending therethrough, said fastening means passing through said vertical guide members, horizontal flanges integral with said side walls, said guide members being molded to and extending from said flanges, and at least one of said flanges having a vertical opening whereby a support member may be disposed on said flanges and held in position by securing means placed in said opening.

4,089,465

WEAR PROTECTIVE LINER ASSEMBLY

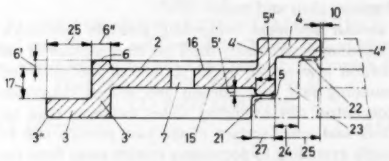
Hans Manuel Aeschbacher, Schaffhausen, and Johann Bottlang, Eschenz, both of Switzerland, assignors to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland

Filed Dec. 15, 1976, Ser. No. 750,672

Claims priority, application Switzerland, Dec. 23, 1975, 16666/75; Sep. 3, 1976, 11195/76

Int. Cl.[2] B65D *25/14, 7/34*

U.S. Cl. 220—400 **16 Claims**



1. A wear protective liner assembly for lining the walls of a chamber subjected to wear, particularly a blast chamber, said assembly being formed of a plurality of liner units arranged adjacent each other in a two-dimensional array, each of said liner units comprising a plate member having four peripheral edges and a pair of generally planar congruent surfaces on opposite sides thereof bounded by said four edges, a first pair of raised lateral flanges extending respectively along two edges of said plate member on one side thereof a second pair of raised lateral flanges extending respectively along the other two edges of said plate member on the opposite side thereof, each of said flanges being arranged to overlap a flange of a next adjacent liner unit when said units are placed alongside each other in said two-dimensional array to form said liner assembly, and a reinforcing bead extending as a raised edge from said surface of said plate member along the peripheral edges thereof opposite to said flange members, each of said flanges being offset from a surface of said plate member by a distance which is at least equal to the sum of the thickness of said plate member and the height by which said bead is raised on said surface.

4,089,466

LINING ALLOY FOR BIMETALLIC CYLINDERS

Donald P. Lomax, 706 S. Waterville Lake Rd., Oconomowoc, Wis. 53066, and Ronald M. Boggs, Rte. 1, Box 56F, Mukwonago, Wis. 53149

Filed Mar. 30, 1977, Ser. No. 782,625

Int. Cl.[2] B65D *25/14;* **B32B** *15/18;* **C22C** *1/10, 30/00*

U.S. Cl. 220—454 **6 Claims**

1. A hard, wear and corrosion resistent alloy consisting essentially of the following materials fused together in the weight percentage composition stated below:

Ingredient	Weight Percent	
Carbon	0.16 to	0.35
Nickel	28.50 to	34.60
Manganese	0.34 to	0.75
Silicon	0.75 to	1.90
Cromium	4.50 to	7.50
Boron	2.25 to	2.90
Cobalt	28.50 to	42.00
Tantalum Carbide	10.00 to	35.00

4,089,467

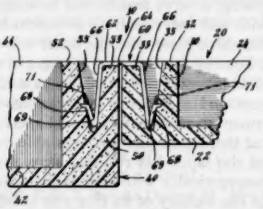
POLYSTYRENE CONTAINER WITH POLYPROPYLENE HINGE AND LATCH

James M. Makowicki, Sandy Hook, Conn., assignor to Curtiscorp, Inc., Sandy Hook, Conn.

Filed Aug. 8, 1977, Ser. No. 822,416

Int. Cl.[2] B65D *43/14, 51/04*

U.S. Cl. 220—334 **16 Claims**



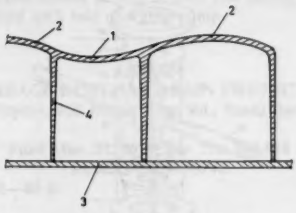
1. A box comprising a container section and a cover, said container section having at least one hinge slot disposed therein, and said cover also having a hinge slot corresponding to each of said container section hinge slots and being positioned adjacent thereto when said cover is in place, and at least one hinge having a flexible top, said top having a pair of legs extending downwardly therefrom, each of said legs having an upwardly extending, protruding blade disposed thereon, one of said legs being disposed in one of said container section hinge slots and the other of said legs being disposed in said corresponding hinge slot of said cover, said hinge being held in place by the interaction of said blades against the sides of said respective hinge slots.

4,089,468

TANKS HAVING MEMBRANES

D. Manuel Dominguez Alonso, Madrid, Spain, assignor to Astilleros y Talleres Del Noroeste S.A., Madrid, Spain

Filed Mar. 21, 1977, Ser. No. 779,339
Claims priority, application Spain, Sep. 27, 1976, 451.890
Int. Cl.[2] B65D *25/18;* B63B *3/68*
U.S. Cl. 220—441 13 Claims



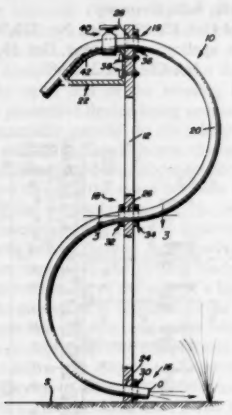
1. A membrane tank having a wall comprised of two sets of warped surfaces, with double curvatures, all sections of which are curved in any plan view, the surfaces of both sets being alike but having curvatures in opposite directions, some being concave and others being convex in an alternating arrangement, said surfaces being tangent at their common borders, each of said surfaces being anchored to a second outer wall by means of partitions which extend perpendicularly to a plane defined by the vertices of said surfaces.

4,089,469

GARDEN WATERING DEVICE

David R. Greig, 927 Noio St., Honolulu, Hi. 96816

Filed Sep. 7, 1976, Ser. No. 721,324
Int. Cl.[2] B05B *15/06*
U.S. Cl. 239—287 4 Claims



1. A garden watering device, comprising a longitudinally extending member provided with spaced attachment means for mounting a hose on the member, and with manipulating means for facilitating handling of the member, with the attachment means mounting the hose such that an outlet of the hose is disposed at a lower end of the longitudinal member when same is oriented substantially vertically, and with the manipulating means being provided at the upper end of the member when same is oriented substantially vertically, the attachment means including a plurality of clamping means mounted in spaced relation along the longitudinal extent of the member for supporting the hose, there being three clamping means mounted on the member and each including a clamp and a hole provided through the member transverse to the longitudinal extent of the member for receiving the hose, with the clamp of each clamp means comprising a collar registering with the associated hole and arranged for receiving the hose, and a set screw in the collar for retainingly engaging the hose, two of the clamping means being disposed adjacent the upper and lower ends, respectively, of the member and the third clamping means being disposed substantially midway along the longitudinal extent of the member, the hose assuming an S-shape when supported by the clamping means.

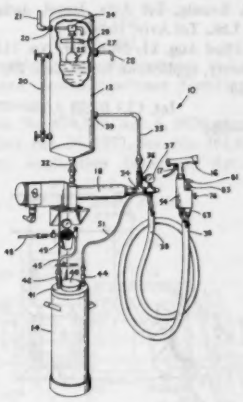
3. In combination with a garden hose including an outlet opening, a garden watering holder for the hose, the holder comprising a longitudinally extending member provided with spaced attachment means for mounting the hose on the member, and with manipulating means for facilitating handling of the member, the attachment means mounting the hose such that the outlet opening of the hose is disposed at a lower end of the longitudinal member when same is disposed substantially vertically, with the manipulating means being mounted at an upper end of the longitudinal member when same is disposed substantially vertically, the attachment means including a plurality of clamps mounted in spaced relation along the longitudinal extent of the member, there being three clamps mounted on the member, two of the clamps disposed adjacent ends of the member and the third clamp disposed substantially midway along the longitudinal extent of the member, the hose assuming an S-shape when supported by the clamps.

4,089,470

PLURAL FLUIDS DELIVERY SYSTEM

Richard D. Strahman, Livingston, N.J., assignor to Strahman Valves, Inc., Florham Park, N.J.

Filed Nov. 9, 1976, Ser. No. 740,200
Int. Cl.[2] B05B *7/04, 7/12*
U.S. Cl. 239—304 3 Claims



1. Apparatus for providing selectively a stream flow of a first liquid and a stream flow of said first liquid combined with a second liquid, comprising:

a first liquid storage tank for storing said first liquid in anticipation of use;

a second liquid storage tank for storing said second liquid in anticipation of use;

a nozzle means for discharging as a stream flow either said first liquid or said first liquid combined with said second liquid, said nozzle means including an inlet opening, a discharge opening and valve means for permitting or interrupting the flow of fluid therethrough;

mixing valve means, said mixing valve means for selectively mixing said first liquid and said second liquid, said mixing valve means including a first inlet opening, a second inlet opening and an outlet opening, said outlet opening of said

mixing valve means being in fluid communication with said inlet opening of said nozzle means;

drain means secured to said first liquid storage tank for limiting the level to which said first fluid may fill said first liquid storage tank;

pump means for pumping said first liquid into a supply hose, said supply hose extending from the discharge of said pump means to said first inlet opening of said mixing valve means;

source connection means disposed on said first liquid storage tank vertically above the level of the level of connection means for connecting said first liquid storage tank to a source of said first fluid;

outlet means on said first liquid storage tank, said outlet means for providing fluid communication between said first liquid storage tank and the inlet of said pump means;

pressure connection means disposed on said storage tank, said pressure connection means for accommodating the connection of said second liquid storage tank to a source of high pressure fluid to propel said second liquid out of said second liquid storage tank; and

an outlet line in fluid communication with and secured to said second liquid storage tank, said outlet line for carrying said second fluid from said second fluid storage tank to said second inlet opening of said mixing valve.

4,089,471

PULSATING SHOWER HEADS

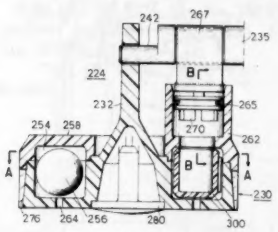
Shulamith S. Koenig, Tel Aviv, Israel, assignor to Incontrol Industries Ltd., Tel Aviv, Israel

Filed Aug. 11, 1976, Ser. No. 713,615

Claims priority, application Israel, Jan. 29, 1976, 48929; Apr. 2, 1976, 49338

Int. Cl.[2] B05B *3/06*

U.S. Cl. 239—381 **11 Claims**



1. A pulsating shower head, comprising: a housing formed with an internal liquid chamber and with a liquid inlet communicating therewith; a spray block having an annular channel communicating with said liquid chamber which annular channel includes a bottom wall formed with an array of outlet openings to produce a plurality of liquid jets exiting from the housing; and at least one slidable segment disposed in said annular channel, said slidable segment including a bottom wall having a bottom face conforming to the face of the bottom wall of the annular channel, a plurality of upstanding side and end walls, and an open top, said slidable segment being drivable in said annular channel by the force of the liquid flowing therethrough to successively cover and uncover said outlet openings and thereby to produce a pulsating effect on said liquid jets exiting from the housing.

4,089,472

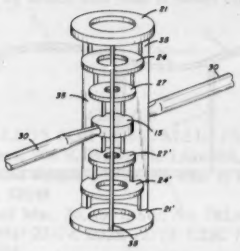
IMPACT TARGET FOR FLUID ENERGY MILLS

Harris T. Siegel, and James R. Olson, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 25, 1977, Ser. No. 790,639

Int. Cl.[2] B02C *19/06*

U.S. Cl. 241—5 **7 Claims**



7. A method for comminuting particles of a solid material, said method comprising discharging the particles carried in a stream of fluid through a conduit to impact against a plurality of impact surfaces arranged in series, the plurality of impact surfaces being constructed and arranged so that each of said plurality of impact surfaces reduces the area for flow of the stream carrying said particles, thus causing a portion of said particles to impact on each impact surface for comminution and causing all of the remaining portion of said particles to impact on a last solid impact surface perpendicular to the stream of fluid.

4,089,473

AGITATOR MILL

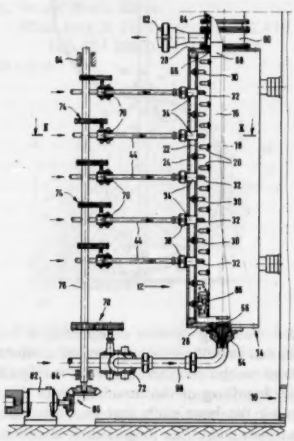
Willy John, Selb, Germany, assignor to Gebruder Netzsch, Maschinenfabrik, Selb, Germany

Filed Oct. 15, 1976, Ser. No. 732,769

Claims priority, application Germany, Oct. 15, 1975, 2546146

Int. Cl.[2] B02C *23/40*

U.S. Cl. 241—41 **9 Claims**



1. An agitator mill for fine grinding and dispersing a suspension of solids in a liquid comprising

a grinding container having an inlet and an outlet for the suspension and further having injection means disposed between said inlet and said outlet for introducing a diluting medium,

an agitator extending into said grinding container and being rotatable therein,

a plurality of grinding elements arranged inside said grinding container and adapted to be moved by said agitator together with the suspension, and

a charging equipment having a charging conduit leading to said inlet, a motor and charging pump connected to said charging conduit and driven by said motor,

said injection means having at least one dosing pump synchronized with said charging pump.

4,089,474

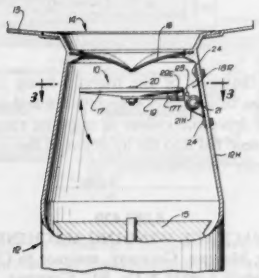
GARBAGE DISPOSAL DRAIN PROTECTOR

Dana W. Timmer, 865 Buena Vista Rd., Santa Barbara, Calif. 93108

Filed Mar. 31, 1977, Ser. No. 783,414

Int. Cl.[2] B02C *18/40*

U.S. Cl. 241—46 B **15 Claims**



1. A garbage disposal unit comprising

a garbage disposal housing having an open end for receiving waste material to be disposed of by means of the disposal and waste material cutting blades rotatably mounted within the housing a preselected distance inwardly of the disposal open end, and

a protective device pivotable secured to the housing intermediate the open end of the housing and the cutting blades, the protective device being normally mounted in a plane substantially parallel to the plane of the disposal open end and extending adjacent the side walls of the housing and yet spaced therefrom to permit waste material to move through the space between the housing and the edge of the protective device, the protective device normally functioning as a guard to trap utensils and similar large objects falling thereon from inadvertently moving through the disposal to the cutting blades and yet being manually pivotable out of the path of a large object that it is desired to dispose of in response to the manual entry of a large object into the open end of the housing and moved against the protective device and pivoted out of its normal position to allow the object to be moved beyond the protective device to the cutting blades and automatically pivots to its normal position after it has been released.

4,089,475

MIXING AND COMMINUTING MACHINE FOR TREATING LIQUID-SOLID MIXTURES

Friedrich J. Zucker, Neuss, Germany, assignor to Supraton F. J. Zucker KG, Neuss, Germany

Filed Jan. 14, 1977, Ser. No. 759,605

Claims priority, application Germany, Jan. 15, 1976, 2601335

Int. Cl.[2] B02C *23/36*

U.S. Cl. 241—46.06 **19 Claims**

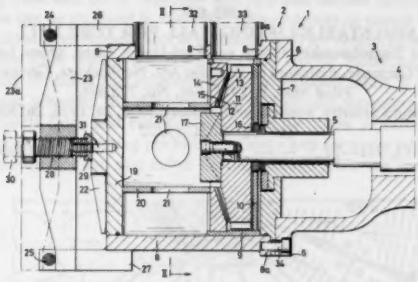
1. A mixing and comminuting machine for the treatment of liquid-solid media and the like by compression and decompression under centrifugal action comprising:

a. a casing having a chamber;

b. rotary drive means at one end of said chamber;

c. an inlet and an outlet in said casing for passing said media through said casing;

d. a replaceable assembly releasably retained in said chamber, said assembly comprising a casing inset, a stator member having a first working surface and being stationarily mounted in said casing inset and a rotor member having a second working surface; and



e. means for rotatably and releasably securing said rotor member to said rotary drive means at said one end of said chamber such that said first and second working surfaces are in spaced confronting relationship and said liquid-solid media may pass therebetween during rotation of said rotor member;

f. whereby when said securing means is released from said drive means, said assembly including said casing inset, rotor member and stator member may be readily replaced as a unit in said mixing and comminuting machine.

4,089,476

TUBE MILL

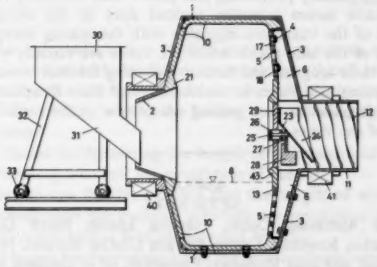
Peter Gauer, Dusseldorf, Germany, assignor to Loesche Hartzerkleinerungs-und Zementmaschinen GmbH & Co. KG, Dusseldorf, Germany

Continuation of Ser. No. 674,969, Apr. 8, 1976, abandoned. This application Jan. 24, 1977, Ser. No. 761,662

Claims priority, application Germany, Apr. 18, 1975, 7512389[U]

Int. Cl.[2] B02C *23/16*

U.S. Cl. 241—70 **7 Claims**



1. In a tube mill for comminution of refuse and other waste materials, grinding members being disposed within the tube mill for contact with the refuse, the tube mill having an inlet opening for receiving the refuse thereinto and an outlet opening for discharge of the comminuted material, the tube mill being formed of a tubular housing having a cylindrical central portion and outwardly diverging frusto-conical portions, the improvement comprising:

an annular outlet sieve wall mounted for rotation in the

housing and having oval passage openings formed therein, the major axes of the oval passage openings being disposed at an angle to radii extending from the axis of rotation of the sieve wall, and

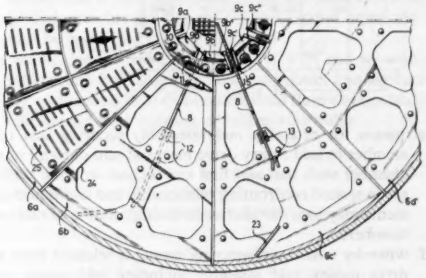
lifting blades mounted to the sieve wall, the blades having inner portions which extend radially from the axis of rotation of the sieve wall, outer portions of the blades being disposed at angles to the inner portions of the blades.

4,089,477

ADJUSTABLE LIFTING WALL FOR TUBE MILL

Peter Tiggesbaumker, Oelde, and Karl-Heinz Alker, Ahlen, both of Germany, assignors to Polysius AG, Neubeckum, Germany

Filed Mar. 9, 1977, Ser. No. 775,694
Claims priority, application Germany, Mar. 26, 1976, 2613062
Int. Cl.[2] B02C *17/02*
U.S. Cl. 241—78 **5 Claims**



1. In a tube mill rotatable about an axis, the improvement therein of a lifting wall assembly comprising a pair of support plate structures in spaced approximately parallel relationship with respect to each other and disposed perpendicular to the axis of rotation of said tube mill, a transfer cone structure mounted with its longitudinal axis approximately in alignment with the axis of rotation of said tube mill and positioned between said support plate structures, and a plurality of lifting vanes positioned between said support plate structures and each vane extending approximately radially from said transfer cone structure and protruding into said transfer cone structure, said lifting vanes each being slidable along its length between said pair of support plate structures, each of said lifting vanes including a plurality of receptacle means arranged along the length of the vane, and wherein said transfer cone structure includes radially projecting side plates each including mating receptacle means whereby various ones of the receptable means of the vanes are alignable with the mating receptacle means of the side plates when the vanes are radially moved along their lengths, and further including fastener means for connecting said vanes at various ones of their receptacles to said side plates at their mating receptacles at the radial inner ends of the vanes.

4,089,478

SEED MILL

Arthur Alexander Collie, Hayling Island; Barry Graham Charles, Rowlands Castle; Edward Charles Barnett, Hayling Island, and Jack Ramshaw, Emsworth, all of England, assignors to Kenwood Manufacturing Company Limited, England

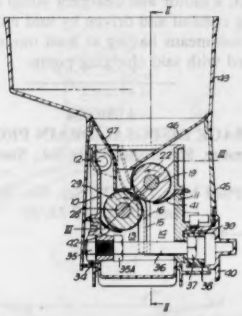
Filed Jan. 26, 1977, Ser. No. 762,622
Int. Cl.[2] B02C *9/02*
U.S. Cl. 241—167 **19 Claims**

1. A domestic seed mill comprising, in combination:

a. a housing having an open top;

b. two rollers mounted in said housing about substantially horizontal axes offset from one another both horizontally and vertically;

c. peripheral surfaces of the rollers formed with a plurality of helical teeth formed as grooves in the rollers, the grooves having the cross-section of a right-angled triangle, with the right-angle at the surface of the roller, two straight sides of the triangle being recessed below said peripheral surfaces of the rollers and defining said



grooves, the apex of the triangle being formed at the intersection of said two straight sides and made arcuate,

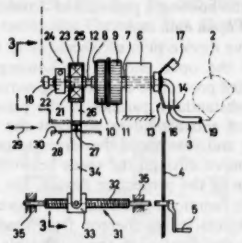
d. means to drive the rollers in opposite rotational senses, whereby seed fed into the lip between the rollers is passed downwardly therebetween.

4,089,479

PACKAGE WINDING MACHINE

Florian Lucke, Mengen, Germany, assignor to Croon & Lucke Maschinenfabrik GmbH & Co. KG, Germany

Filed Apr. 26, 1976, Ser. No. 679,992
Claims priority, application Germany, May 2, 1975, 2519630
Int. Cl.[2] B65H *54/10, 54/64*
U.S. Cl. 242—2 **4 Claims**



1. In a yarn package winding machine comprising a main machine frame, a plurality of winding spindles rotatably mounted on said frame, and a plurality of hollow travellers rotatably mounted on said frame, there being one of said travellers for each of said winding spindles, each of said travellers having a first crank arm and a second crank arm, said second crank arm extending coaxial of the axis of rotation of said traveller and said first crank arm extending transversely from said second crank arm, each of said travellers supplying the associated winding spindle with yarn to be wound thereon to form a package on the spindle, the travellers remaining axially stationary with respect to the winding spindles during formation of the packages, the improvement comprising a hollow shaft surrounding part of each of said second arms and having fork means to embrace the first crank arm of the traveller, thereby to rotate the traveller upon rotation of said hollow shaft, said second arm being axially displaceable in said hollow shaft and projecting from said hollow shaft at the end opposite the first crank arm, a drive member rotatably mounted on the

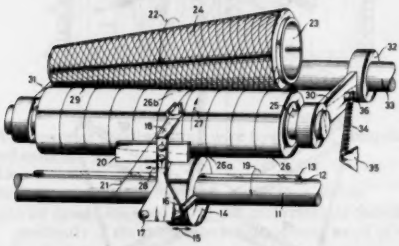
projecting portion of the second arm, guide means connected to said drive member, stationary slide bearings displaceably supporting said guide means, and common transverse drive means for shifting said guide means on said slide bearings parallel to the axes of rotation of said travellers to adjust said travellers in unison relative to said spindles.

4,089,480

WINDING APPARATUS FOR FRICTION-DRIVEN CONICAL CROSS-WOUND COILS

Heinz Kamp, Rickelrath, Germany, assignor to W. Schlafhorst & Co., Monchen-Gladbach, Germany

Filed Dec. 12, 1975, Ser. No. 640,221
Claims priority, application Germany, Dec. 12, 1974, 2458853
Int. Cl.[2] B65H *54/42*
U.S. Cl. 242—18 DD **11 Claims**



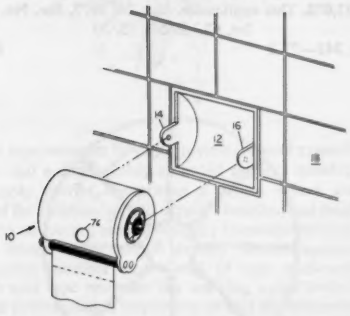
1. In apparatus for winding a friction-driven conical cross-wound coil, a plurality of first rotating members in the form of bodies of rotation disposed so as to support the coil at the peripheral surface thereof from below without directly driving the coil by friction, and a second rotating member engaging the peripheral surface of the coil from below for effecting direct frictional drive of the coil, said first rotating members having a common rotary axis, said second rotating member having a rotary axis differing from that of said plurality of first rotating members.

4,089,481

DECORATIVE TOILET TISSUE ENCLOSURE

Richard W. Ciuci, 3 Marseilles Dr., Locust Valley, N.Y. 11560

Filed Nov. 26, 1976, Ser. No. 745,102
Int. Cl.[2] A47K *10/38, 10/22*
U.S. Cl. 242—55.53 **4 Claims**



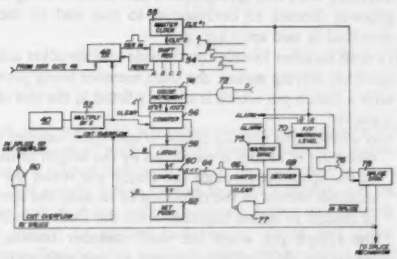
1. A toilet tissue roll receiving enclosure mountable in a toilet tissue support including in combination a hollow container formed with an open end, an end wall providing a closed end, an outer cylindrical wall, a hollow cylinder projecting from said end wall concentrically with said outer wall, said hollow cylinder having an outside dimension less than the inside dimension of said toilet tissue roll so that said toilet tissue roll can be received therein within said outer wall, an enclosure cover receivable on said outer cylindrical wall for closing said container, a central mounting aperture in said end wall, a first mounting pin within said hollow cylindrical and projecting through said aperture, an abutting surface of said enclosure cover, spring means disposed between said abutting surface and said first mounting pin yieldingly urging said first mounting pin through said aperture, a second mounting pin projecting from said cover whereby said first and second mounting pins can be received in said toilet tissue support to mount said enclosure, an opening slot in said outer wall for receipt of toilet tissue from within said container, said second mounting pin being threaded and received within a threaded insert in said cover whereby the distance from said second mounting pin projects from said cover is adjustable by screw adjustment, said second mounting pin having a flange grip for screw adjustment thereof and said cover having a flange receiving well.

4,089,482

AUTOMATIC WEB SPLICE CONTROL SYSTEM

John F. Mooney, West Chester, and Allen Brent Woolston, Wynnewood, both of Pa., assignors to Molins Machine Company, Inc., Cherry Hill, N.J.

Filed Apr. 26, 1977, Ser. No. 791,095
Int. Cl.[2] B65H *19/18*
U.S. Cl. 242—58.1 **15 Claims**



1. An automatic splice control system for a web splicer apparatus which includes at least one running web roll and one ready web roll and a splice mechanism for splicing the expiring end of the running web to the leading end of the ready web, comprising:

first means for measuring the length of web unwound from a running web roll per revolution of the roll;

second means for determining that the length of web unwound from the running web roll per revolution of the roll is less than a first pre-selected length;

third means for determining that the length of web unwound from the running web roll per a pre-selected number of revolutions of the roll reaches a second pre-selected length;

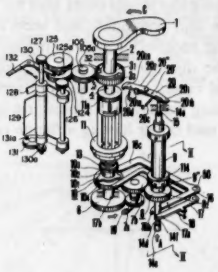
fourth means operatively connected to said first and third means for dynamically incrementing said first means; and,

fifth means connected to said third and fourth means for causing a splice mechanism to initiate a splice sequence wherein the expiring end of the web on the running web roll is spliced to the leading end of the web on the ready web roll.

4,089,483
FILM FEEDING DEVICE FOR CAMERA

Sakae Hokkanji, Fukushima; Masami Shimizu; Akio Sunouchi, both of Tokyo; Yukio Iura, Yokosuka; Masayoshi Yamamichi, Kawasaki, and Yoshiaki Watanabe, Fujisawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 25, 1977, Ser. No. 762,247
Claims priority, application Japan, Feb. 4, 1976, 51-11630[U]
Int. Cl.[2] G03B *1/06*
U.S. Cl. 242—71.4 10 Claims



1. A film feeding device for a camera comprising;

(a) a film wind-up means which gradually winds a preset amount of film on a film take-up spool;

(b) a film feeding cylindrical sprocket which is capable of rotating only and which is provided with a slot extending substantially in parallel with the axis of the sprocket;

(c) a cylindrical sprocket driving means which is capable of rotating only and which is interlocked with the film wind-up means to be driven in response to a film winding operation of the film wind-up means, said means being disposed coaxially with said sprocket and said means having clutch grooves formed to correspond to one end of the slot provided in said sprocket; and

(d) a shaft member loosely fitted inside said sprocket and said sprocket driving means, the shaft member being provided with a clutch pin which is slidably fitted in the slot of said sprocket;

and wherein the moving extent of said shaft member in the direction of its axis is restricted by the length of the slot of the sprocket through the clutch pin when the shaft member moves in the direction of its axis; the sprocket is caused to rotate together with the shaft member by the clutch pin when the shaft member rotates; and, when the shaft member moves to one side within the restriction being imposed by the slot, the clutch pin comes to mechanically engage with said clutch groove thus to transmit the driving force of the sprocket driving means to the shaft member and, when the shaft member shifts to the other side, the clutch pin is disengaged from the clutch groove to release the sprocket driving means from mechanical engagement with the shaft member and thereby the permit free rotation of said sprocket.

4,089,484
TAKE-UP FRAME FOR PILE FABRIC

Axel Schneider, Krefeld, Germany, assignor to Scheibler Peltzer & Co., Krefeld, Germany

Continuation-in-part of Ser. No. 546,132, Jan. 31, 1975, Pat. No. 4,044,966. This application Aug. 29, 1977, Ser. No. 828,419
Int. Cl.[2] B65H *75/02*
U.S. Cl. 242—77.1 5 Claims

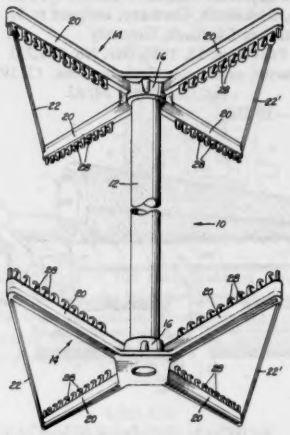
1. A take-up frame for pile fabric comprising, in combination;

two spaced-apart suspension frames, each having a central hub with a cylindrical bore provided therein;

a cylindrical shaft extending between said frames and having its ends seated in said cylindrical bores;

each of said frames having a plurality of angularly spaced, radial slots provided therein on the one side facing away from the other frame, said slots extending only part way through the thickness of the frame;

a plurality of slot-like apertures extending through said frames from the bottom of each of said radial slots to the other side of the frame, said slot-like apertures being



spaced apart equidistantly from one another along the length of the respective slot;

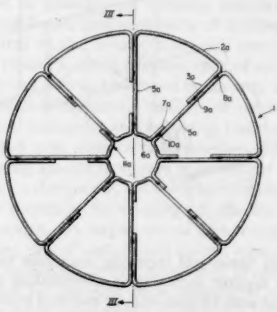
a hook band inserted into said slot, said hook band comprising a plurality of hooks spaced apart from one another the same distance as the space between said slot-like apertures, said hooks being joined together; and

means on said hook band abutting against the bottom of said slot to limit the movement of the hooks toward said other side of the frame, with the hooks projecting from said other side of the frame to engage the pile fabric.

4,089,485
REEL FOR THE STORAGE OF FILAMENTARY MATERIAL

Guido Van de Loock, Hemiksem, Belgium, assignor to Bekaert-Cockerill, Hemiksem, Belgium

Continuation-in-part of Ser. No. 686,007, May 13, 1976, Pat. No. 4,032,078. This application Apr. 26, 1977, Ser. No. 791,045
Int. Cl.[2] B65H *75/20*
U.S. Cl. 242—77.2 4 Claims



1. A reel for the storage of filamentary material comprising

a plurality of elements each made of a single piece of wire bent to form a sector of the reel and all secured together in a circular array, in which each element has two axially spaced circumferentially extending bearing portions at the radially innermost regions thereof, all of said bearing portions of the respective elements co-operating to define two axially spaced bearing rings for mounting the reel on a shaft.

4,089,486

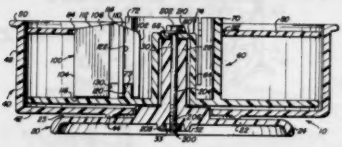
WIRE DISPENSING APPARATUS

Earnest Ray Carter, 2515 N. 7th St., Phoenix, Ariz. 85006

Filed Jul. 5, 1977, Ser. No. 812,685

Int. Cl.[2] B65H *49/00*

U.S. Cl. 242—129 **14 Claims**



1. Apparatus for dispensing wire from a coil, comprising, in combination:

base means;

tub means rotatably disposed on the base means;

carrier means disposed in the tub and rotatable therein independently of the tub means for supporting a coil of wire to be dispensed;

lid means disposed on the carrier means for maintaining the coil of wire on the carrier means; and

means for securing the carrier means to the base means.

4,089,487

APPARATUS FOR TAPE RECORDER

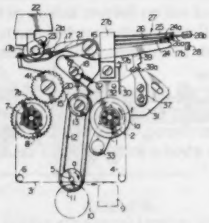
Hiroki Ichikawa, and Masao Kobayashi, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 15, 1976, Ser. No. 723,593

Claims priority, application Japan, Mar. 22, 1976, 51-34218

Int. Cl.[2] G11B *15/02, 15/30*

U.S. Cl. 242—186 **2 Claims**



1. In a tape recorder having a review/rewind manual control member and a displaceably mounted support member with a tape supply carrier comprising a driven wheel and being mounted for rotation on said support member and displaceable therewith an having means whereby increased tension of tape on said driven wheel carried thereby effects displacement of said support member at the end of tape undwinding and wherein said tape recorder has warning signal switch means disposed to be actuated responsive to said displacement of said support member for effecting energization of a warning signal when tape tension increases and including drive means movable against said driven wheel to effect driving engagement for review-rewind rotation responsive to operation of said manual control member;

the improvement which comprises detent means for preventing a false warning signal due to unwanted displacement of said support member caused by said driving engagement when said manual control member is operated;

said detent means comprising a detent element actuatable by operation of said manual control member to move to a predetermined position relative to said support member;

and a coacting detent element carried by said support member engageable with said first mentioned detent element thereby preventing displacement of said support member to preclude actuation of said signal switch means during review/rewind operation of said tape recorder.

4,089,488

TAPE TRANSPORT APPARATUS

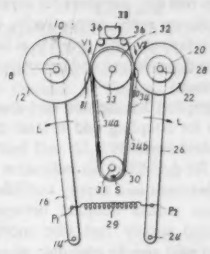
Kiyosi Isikawa, c/o Omron Tateisi Electronics Co., 10, Hanazono Tsuchidocho, Ukyo-ku, Kyoto, Japan (615)

Filed Apr. 16, 1976, Ser. No. 677,790

Claims priority, application Japan, Apr. 24, 1975, 50-56549[U]; Nov. 17, 1975, 50-156748[U]

Int. Cl.[2] G11B *15/32;* **B65H** *17/14*

U.S. Cl. 242—192 **14 Claims**



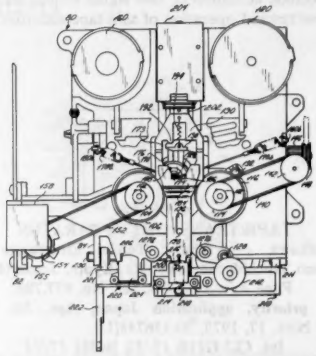
1. A tape transport apparatus comprising a supply hub on which a length of pliable tape is wound to form a supply roll thereon; a takeup hub onto which the tape that is unwound from said supply roll is wound to form a takeup roll on said takeup hub; a drive pulley; a driven pulley paired with said drive pulley; an endless belt passing about said drive and driven pulleys so that said belt when driven forms relatively slackened and tensioned portions that exhibit a difference in speed, said slackened belt portion being in frictional contact with a peripheral turn of said tape on said supply roll so as to rotate said supply roll thereby causing said tape to be paid out therefrom and said tensioned belt portion being in frictional contact with a pheripheral turn of said tape on said takeup roll so as to rotate said takeup roll thereby causing the paid out tape to be wound onto said takeup roll; the speed difference between said tensioned and slackened belt portions tending to cause the tape to be wound onto said takeup roll at a faster rate than the rate at which said tape is withdrawn from said supply roll, thereby tensioning said tape running between said supply and takeup rolls; and resilient means for urging said supply and takeup rolls toward said belt, said resilient means being arranged with respect to said driven pulley and said belt so that the peripheral turn of the tape on said supply roll is initially brought into said frictional contact with the slackened portion of said belt at the point at which said belt initially joins said driven pulley, and so that the peripheral turn of said takeup roll separates from said frictional contact with the tensioned portion of said belt at the point at which said belt leaves said driven pulley.

4,089,489

BRAKING APPARATUS FOR A WEB TRANSPORT SYSTEM

James C. Whitney, Fairfield, Conn., assignor to Dictaphone Corporation, Rye, N.Y.

Filed Apr. 20, 1976, Ser. No. 678,597
Int. Cl.[2] G03B 1/04; G11B 15/32
U.S. Cl. 242—204 **10 Claims**



5. In a tape recording and/or playback apparatus having supply and take-up reel disc members for supporting and rotating supply and take-up reels, respectively, for moving tape therebetween at a relatively slow speed in at least one direction and at a higher speed in said one and opposite directions, brake apparatus comprising:

at least one motor for driving said reel disc members;

coupling means for coupling said at least one motor to said take-up reel disc member;

counter means for providing an indication of the length of tape moved between said supply and take-up reels;

first transmission means coupled between said counter means and said supply reel disc member and driven thereby when said supply reel disc member is driven to drive said counter means;

indicator means for providing an indication of the relative portion of said tape which then is moving between said supply and take-up reels; and

second transmission means coupled between said indicator means and said take-up reel disc member and driven thereby when said take-up reel disc member is driven to drive said indicator means;

said counter means, indicator means and respective transmission means exerting retarding forces on said reel disc members such that when said reel disc members are not driven by said motor, said retarding forces brake said reel disc members and arrest the movement of tape.

4,089,490

FILM TRANSPORT MECHANISM

Roberto Quintanar, 919 E. Magnolia; Sergio Quintanar, 1064 E. Providentia; Alexandro Quintanar, 919 E. Magnolia, all of Burbank, Calif. 91501, and Delbert K. Matthews, 7853 Sancola Ave., Sun Valley, Calif. 91352

Filed Jul. 2, 1975, Ser. No. 592,786
Int. Cl.[2] G03B 1/04, 1/54
U.S. Cl. 242—181 **10 Claims**

1. A film transport mechanism for supplying film to and receiving film from a separate motion picture projector comprising:

a supporting frame for positioning adjacent to a motion picture projector;

a first arbor rotatably mounted on said frame for supporting a film supply reel;

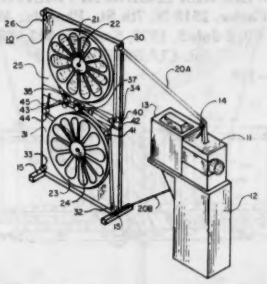
a second arbor rotatably supported on said frame for supporting a film takeup reel;

first motor means for driving said second arbor;

a sprocket rotatably mounted on said frame;

roller means for directing film from a supply reel on said first arbor to pass over said sprocket and thence to the film supply input of an associated motion picture project

additional roller means directing return film from said associated motion picture projector around a portion of said



sprocket and thence to a film takeup reel supported by said second arbor;

said sprocket driven by film passing thereacross for maintaining a fixed rate of film to and from said projectors;

idler means secured to said frame and movable responsive to variation in film tension between said sprocket and said second arbor;

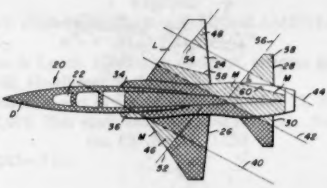
speed control means for said first motor means responsive to return film tension as detected by said idler means.

4,089,491

CAMOUFLAGED AIRCRAFT, SURFACE VESSEL OR VEHICLE OR THE LIKE

Carlisle Keith Ferris, 50 Moraine Rd., Morris Plains, N.J. 07950

Filed Mar. 22, 1976, Ser. No. 668,983
Int. Cl.[2] B64D 7/00
U.S. Cl. 244—1 R **45 Claims**



1. A camouflaged and deceptive perception distorted vehicle comprising:

a. a top surface, a bottom surface and upper and lower side surfaces,

b. said top and side surface having a plurality of visually contrasting surface areas thereon,

c. said top surface having left and right side areas,

d. said contrasting surface areas having lines of demarcation therebetween

e. said contrasting surface areas comprising a light area and a darker area,

f. said darker area being solid and substantially unbroken and substantially covering all of one of said left and right side areas of said top surface,

g. said light area substantially covering the remaining portion of the other of said left and right side surface areas of said top surface, and

h. substantially all of the lines of demarcation of said contrasting surface areas of said side surface of said vehicle substantially paralleling the longitudinal axis of said vehicle, and

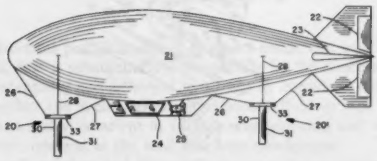
i. substantially all the lines of demarcation of said contrasting surface areas of said vehicle on said top surface being substantially diagonal with respect to the longitudinal axis of said vehicle and run in substantially the same direction.

4,089,492

OCEAN ADAPTED AIRSHIP

Thomas G. Lang, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 27, 1977, Ser. No. 763,271
Int. Cl.[2] B64B *1/70, 1/20*
U.S. Cl. 244—30 **8 Claims**



6. In an airship for operating over a body of water an improvement therefor is provided comprising:

means depending from the airship for providing tensile support only;

a pair of struts provided with movable control surfaces for changing and maintaining the heading of the airship, each strut having an elongate chamber extending at least a portion of its length for optionally containing ballasting water and each of the struts is coupled to the tensile support providing means and has a sufficient length for extending from above the surface of the body of water to below the surface waves, each of the struts has a vertical length in excess of its chord and a streamlined lateral cross-sectional configuration to stabilize the airship as the airship is situated above the water's surface;

an articulated hydrofoil carried on the lower end of each of the pair of struts and extending laterally outwardly therefrom for controlling the immersion depth of the pair of struts; and

means mounted on the upper end of the pair of struts above the water's surface for ballasting the airship and for adjusting the height above water to permit improved control of the airship near the surface of a body of water.

4,089,493

AIRCRAFT WITH COMBINATION POWER PLANT

Allen E. Paulson, 7701 Woodley Ave., Vay Nuys, Calif. 91406

Filed Sep. 29, 1976, Ser. No. 727,950
Int. Cl.[2] B64D *37/00*
U.S. Cl. 244—135 R **6 Claims**

1. An aircraft having in combination:

a low profile highly streamlined fuselage having a wing comprising two sections respectively having fuel tanks disposed therein;

a nose mounted turboprop engine;

a tail mounted turbojet engine of relatively low horsepower in respect to said turboprop engine;

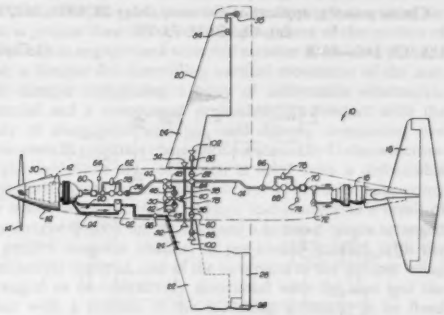
a fuel feed system common to both engines and including both a pressure pump and a stand-by pump;

a pair of main fuel feed lines leading respectively from said fuel tanks to the inlet sides of said pumps;

a pressure manifold directly connected between said engines;

fuel lines connecting the outlet sides of said pumps to said manifold;

said fuel system common to both engines including fluid flow equalizing means disposed between the opposite ends



of said main fuel feed lines and said pressure and stand-by pumps; and

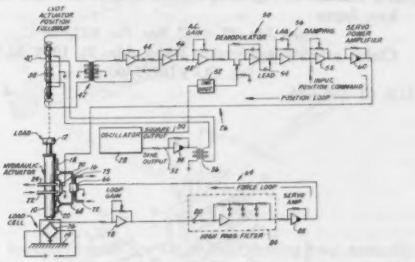
check valve means series connected between the outlet sides of said pumps and said manifold.

4,089,494

REDUCED SERVO NOISE CONTROL FOR A HYDRAULIC ACTUATOR

Alvin M. Anderson, Long Beach; William Comley, Rancho Palos Verdes, and Douglas B. Engum, Huntington Beach, all of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Dec. 16, 1976, Ser. No. 751,532
Int. Cl.[2] G05D *1/10*
U.S. Cl. 244—178 **8 Claims**



1. An electrically controlled hydraulic actuator system having a position sensor and a first controlled servo valve hydraulically connected to move the hydraulic actuator to commanded positions, said first controlled servo valve having a position loop connected thereto and to the position sensor, the frequency response of the position loop so formed being below a predetermined value, the improvement comprising:

a second controlled servo valve hydraulically connected to said hydraulic actuator;

a force sensor connected to said hydraulic actuator, said sensor generating electrical signals which correspond to the forces generated by said hydraulic actuator; and

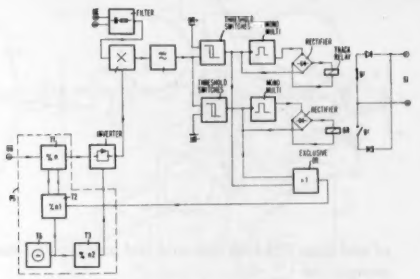
a high pass filter which feeds predetermined high frequency components of said sensor signals to said second controlled servo valve which applies hydraulic energy degeneratively to said actuator whereby said improvement reduces undesired high frequency vibrations of said system.

4,089,495

PHASE-CONTROLLED TRACK CIRCUIT RECEIVER

Alan Clifford Knight, Munchingen, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed May 11, 1977, Ser. No. 795,994
Claims priority, application Germany, May 28, 1976, 2623967
Int. Cl.[2] B61L *21/00*
U.S. Cl. 246—34 R **3 Claims**



1. A fail safe track circuit receiver having an output signal level which is substantially independent of phase variation of an input ac voltage, comprising:

an ac reference voltage;

means for providing automatic phase control for maintaining a given phase relationship between said input ac voltage and said ac reference voltage;

means for providing synchronous detection of said input ac voltage having said given phase relationship; and

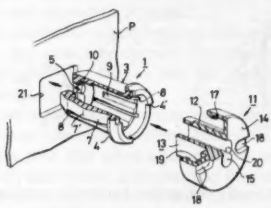
means for shifting said given phase relationship for performing a continuous functional check.

4,089,496

CORD GROMMET

Akira Mizusawa, Fujisawa, Japan, assignor to Nifco Inc., Tokyo, Japan

Filed Jun. 20, 1977, Ser. No. 807,848
Claims priority, application Japan, Jun. 21, 1976, 51-72165
Int. Cl.[2] F16L *5/00*
U.S. Cl. 248—56 **4 Claims**



1. A cord grommet comprising:

(a) a female member of the shape of a tube having a non-circular outside cross section and an approximately circular inside cross section, one end of said tube being provided with a wall having an oblong hole bored for passage of a cord and the other end thereof being open and having an outer flange, said tube being divided by longitudinal slits into two opposed pairs of walls, the members of one pair of which are each provided with an engaging projection on the outside thereof and said tube being provided on the inside thereof with circumferentially spaced recesses and

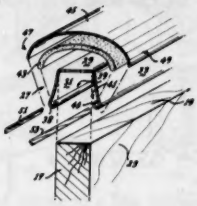
(b) a male member composed of a shaft of an approximately elliptic outside cross section and engaging means, said shaft being adapted to be inserted into said female member through the open end thereof and rotatably set in position therein, said male member including an oblong hole extending throughout the entire length thereof and further provided on the outside thereof with circumferentially spaced protrusions receivable by the recesses of said female member and said engaging means being integrally connected to one end of said shaft and provided on the outer boundary with a claw adapted to be engaged with the edge of the flange of said female member.

4,089,497

RAIL CAP

Curtis G. Miller, 2905 N. Bristol, Apt. L, Santa Ana, Calif. 92706, and Craig S. Miller, 1221 S. Marine, Santa Ana, Calif. 92704

Filed Jan. 28, 1977, Ser. No. 763,306
Int. Cl.[2] A47B *95/00*
U.S. Cl. 248—345.1 **18 Claims**



1. A cap adapted for use with an elongated member having a lateral surface extending along the member, the cap including:

support means adapted to fit over at least a portion of the member and including an elongated wall extending along the member and being biased in the direction of the lateral surface of the member for retaining the support means in a substantially fixed relationship with the elongated member;

resilient means covering at least a portion of the support means including at least a portion of the elongated wall of the support means and having characteristics for being resiliently compressed at least in the direction of the support means;

surface means having a marginal portion and being adapted to cover at least a portion of the resilient means and the support means including the elongated wall of the support means, the surface means forming the outer surface of the cap;

an edge portion of the support means forming a trough disposed along the elongated wall of the support means, the edge portion being biased by the support means toward the lateral surface of the elongated member;

the surface means being bent around the edge portion of the support means with the marginal portion of the surface means extending into the trough;

retention means for engaging the marginal portion of the surface means within the trough for retaining the surface means in the covering relationship with the resilient means; whereby

the marginal portions of the surface means are biased by the support means into frictional engagement with the lateral surface of the elongated member to retain the cap on the elongated member.

4,089,498

12 HOUR COASTER

George N. Woodruff, Box 517, Rte. 3, Merritt Island, Fla. 32952

Filed Feb. 17, 1977, Ser. No. 769,789
Int. Cl.[2] A47G *29/02*
U.S. Cl. 248—346.1 **7 Claims**

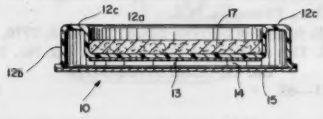
1. A long term coaster for removing and containing the condensate formed on the outside of glasses containing iced beverages and preventing condensate from forming on the furniture underneath the coaster or on the outside walls of the

coaster itself and subsequently dripping onto the furniture comprising:

a body of liquid impervious non-warpable material having a liquid impervious central well portion encircled by an uninterrupted upstanding wall portion,

the central well portion being elevated above and out of contact with any supporting surface, providing a thermal insulation region underneath the well portion,

said encircling wall portion including an inside wall in communication with the well portion and an outside wall portion that is disposed to provide poor thermal connection to the inside wall,



an adsorbent pad of material disposed inside the well portion, that is substantially non-wettable by the condensate, substantially non-adherent to a glass or container surface whether the well contains condensate fluid or not, and substantially invarient in surface configuration and volumetric content as the well fills with condensate,

said well portion and side wall portions being integrally formed of plastic material, with said inner and outer wall portions being spaced apart from one another for a distance sufficient to prevent condensate forming on the outside wall portion,

and vapor impermeable means disposed beneath the well for preventing the deposit of moisture on a supporting surface beneath the coaster.

4,089,499

SEATS

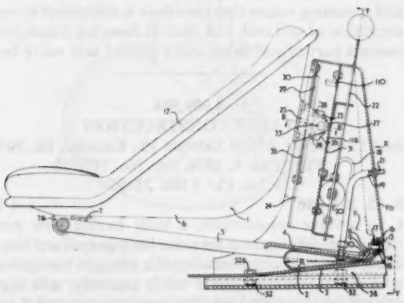
Peter George Ware, Rugby, and Harold William White, Coventry, both of England, assignors to Dunlop Limited, London, England

Continuation of Ser. No. 331,118, Feb. 9, 1973, abandoned. This application Nov. 19, 1974, Ser. No. 525,096

Claims priority, application United Kingdom, Feb. 18, 1972, 7547/72; Aug. 12, 1972, 37732/72; Dec. 1, 1972, 55492/72; Dec. 1, 1972, 55493/72

Int. Cl.² F16M *13/00*

U.S. Cl. 248—376 **2 Claims**



1. A seat assembly comprising a seat provided with a vibration damping mounting including two rigid relatively rotatable members disposed below the level of the seat, one member being operatively associated with the seat and the other member being operatively associated with a component on which the seat assembly is mounted and a pouch filled with fluid under pressure and formed as a single wedge shaped chamber disposed between the two members so that vertical movement of the seat results in relative rotation of the two members towards each other and compresses the pouch and increases the area of contact of the pouch with the two members, the member associated with the seat being connected to the seat at a position further from the axis of rotation of said member than the position of the pouch so that vertical displacement of the seat is greater than the vertical displacement of the portion of the pouch in engagement with said member associated with the seat; a damper for controlling vertical movement of the seat, said damper comprising a body of deformable elastomeric material and a component preloaded into contact with the body of elastomeric material, said damper comprising two basic parts, a guidance channel of substantially U-shaped cross-section only one side of which is lined with a deformable elastomeric material an other side not so lined for supporting the main load transmitted through said damper as a result of any weight applied on the seat, and a locating means arranged to project into the channel in pre-loaded contact with the elastomeric material, one of the two parts of the damper being arranged to be operatively associated with the seat and the other with a portion of the mounting arranged to be fixed relative to the component on which the seat assembly is to be mounted, the damping arrangement being such that vertical movement of the seat results in the displacement of the locating member along the channel, this displacement, and hence the vertical movement of the seat, being resisted and damped by the internal hysteresis of the elastomeric material.

4,089,500

LOCKING DEVICE, PARTICULARLY FOR AUTOMOBILE SEATS

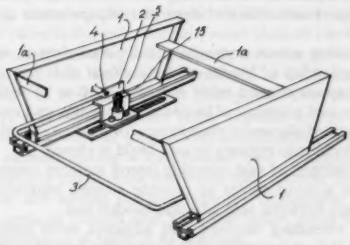
Gustaf Erik Gustafsson, Januarinägen 19, Växjö, Sweden

Filed Feb. 14, 1977, Ser. No. 768,023

Claims priority, application Sweden, Feb. 19, 1976, 7601996

Int. Cl.² F16M *13/00*

U.S. Cl. 248—429 **9 Claims**



1. A locking device for adjustably locking two mutually movable parts with respect to each other, particularly for blocking the longitudinal movement of an automobile seat with respect to the floor of an automobile, comprising

(a) a stationary member secured to the floor of the automobile,

(b) a movable member secured to the automobile seat, said stationary member having an elongated aperture with teeth disposed along its opposed longitudinal sides, said movable member comprising a first bracket,

(c) a locking pin, said locking pin having a shaft and an elongated head disposed at right angles to said shaft and aligned with the elongated aperture of said stationary member, said elongated head having a plurality of teeth on both of its opposing longitudinal sides for engaging selected teeth of the elongated aperture,

(b) bias means for normally urging the teeth of the head of the pin and the teeth of the elongated aperture in secure engagement with each other in the locking position of the seat, and

(e) a control member, said control member, being adapted, when actuated, to displace the head of the locking pin in

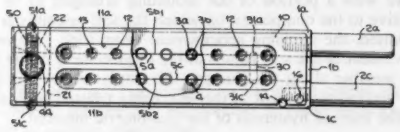
the longitudinal direction of the shaft, with the teeth of the head of the locking pin being retained parallel to the teeth of the elongated aperture, said displacement being carried out to such extent that the teeth of the head of the locking pin disengage the teeth of the elongated aperture so that the stationary member and the movable member may be displaced longitudinally with respect to each other, whereas said teeth engage each other so as to ensure locking of the stationary member and the movable member with respect to each other when said control member is unactuated.

4,089,501

BULLET MOLD

George Zahoran, 1906 Doren St., S. El Monte, Calif. 91733

Filed Jan. 31, 1977, Ser. No. 764,398
Int. Cl.[2] B22C *9/22*; B22D *25/02*
U.S. Cl. 249—171 10 Claims



1. In a mold for casting bullets comprising a plurality of adjacent mold blocks having paired opposing cavity portions within opposing lateral surfaces of adjacent blocks for forming casting cavities when said mold is closed and said opposing lateral surfaces are in contact, cut-off means moveable in a plane perpendicular to said opposing lateral surfaces of said adjacent blocks having apertures therethrough for permitting introduction of molten material into said casting cavities and for removing excess material from the finished bullets as cast and pivot means for connecting said blocks and permitting relative movement therebetween, the improvement comprising:

interlocking means comprising individual slots in each of said plurality of blocks, said individual slots providing a continuous aligned relief across a portion of said mold when said plurality of blocks is in registry, and receiving associated alignment plate means for guiding said plurality of blocks into registry as said mold is closed;

means integral of said opposing lateral surfaces cooperating about a pivot center to provide arcuate separation and closure between said adjacent blocks; and

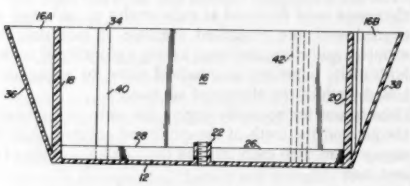
means extending through said adjacent mold blocks for retaining at least a portion of said opposing lateral surfaces of said adjacent blocks in contact during the arcuate separation and closure of said blocks.

4,089,502

MODULAR KNOCK-OUT CAVITY FORMING INSERTS

Arthur C. Miller, Rte. 29 Devevalt, Birchrunville, Pa. 19432

Filed Mar. 10, 1977, Ser. No. 776,334
Int. Cl.[2] B28B *7/34*
U.S. Cl. 249—177 11 Claims



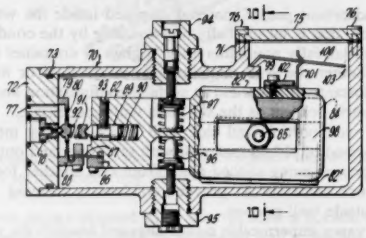
1. A modular knock-out insert comprising a body having a bottom wall connected to upstanding outwardly directed end and side walls constituting peripheral walls, said bottom wall being in one piece with said end and side walls, internal side and end panels extending generally perpendicular to said bottom wall, said panels and bottom wall being integral in one piece and connected adjacent the intersection between said bottom wall and said peripheral walls, at least one of said panels having a pair of spaced locking means for securement with mating locking means on another body.

4,089,503

ELECTROMECHANICALLY ACTUATED VALVE

Robert E. Raymond, Zanesville, Ohio, assignor to DeLaval Turbine Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 649,657, Jan. 16, 1976, Pat. No. 4,053,137. This application Oct. 21, 1976, Ser. No. 734,419
Int. Cl.[2] F16K *31/08*, *31/10*
U.S. Cl. 251—65 9 Claims



1. Electromechanically operated valve structure, comprising a valve body having a passage for pressure fluid flow, a movable valve member for controlling said flow, and actuating means for said valve member; said actuating means comprising magnetic-core means establishing two spaced substantially parallel gaps which are directionally polarized in opposite directions, an electrically conductive coil having a course defining two substantially parallel legs that are spaced substantially in accordance with the spacing of said gaps, means including a compliantly suspended beam movably mounting and orienting said coil with respect to said core means such that each of said legs is positioned with clearance within and substantially parallel to a different one of said gaps, said mounting means constraining and guiding said coil for movement which is substantially in the plane of said legs and normal to the orientation of said legs, said valve member being so connected to said mounting means that such flow is controlled in response to excitation of said coil, and viscous damping means coacting between a part of said beam and a part of said valve body.

4,089,504

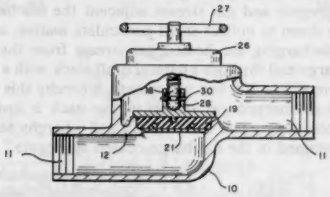
VALVE CONSTRUCTION

Robert L. Giuliani, 45310 Akimala Pl., Kaneohe, Hi. 96744

Filed Dec. 6, 1976, Ser. No. 747,718
Int. Cl.[2] F16K *25/00*
U.S. Cl. 251—86 4 Claims

1. In a valve construction, a body having flow passages, valve seat means disposed between the passages and having an opening communicating between the passages for open condition of the valve, a movable valve assembly, and operating means connected to the assembly operable to move the assembly in opposite directions between open and closed sealed positions relatively to the seat means, the seat means comprising a portion secured to the body and formed to provide a substantially cylindrical surface surrounding said opening in alignment with the valve assembly, said portion also being formed to provide an inwardly extending annular shoulder at one end of the cylindrical surface, the valve assembly comprising an annular sealing member of resilient material dimen-

sioned when relaxed to interfit the cylindrical surface, and rigid annular compression members disposed on opposite sides of the sealing member, one of said rigid members being dimensioned to be accommodated within the cylindrical surface and to engage said shoulder when the sealing member is moved into the cylindrical surface, closing forces applied by the operating means after engagement of the one rigid member with the shoulder serving to compress and to radially expand the seal-



ing member to press the periphery of the same into sealing contact with the cylindrical surface, said shoulder having an annular conical seating surface adapted to engage a conical surface formed on the periphery of the one compression member, the other compression member having a diameter greater than the diameter of the cylindrical surface and engaging said seating means at the other end of the cylindrical surface for closed and sealed position of the valve assembly thereby to limit compression of the sealing member.

4,089,505

OSCILLATING SLIDE VALVE

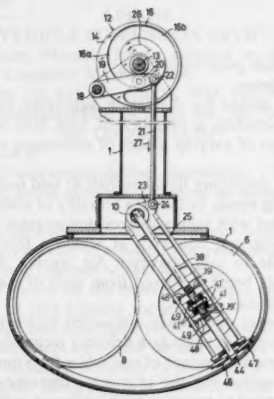
Fritz Anderle, Hanau; Gerhard Frey, Munich; Lutz Grein, Hanua; Uwe Reimpell, Hanau, and Friedrich Stark, Hanua, all of Germany, assignors to Leybold-Heraeus GmbH & Co. Kommandit-Gesellschaft, Cologne, Germany

Filed Nov. 8, 1976, Ser. No. 740,031

Claims priority, application Germany, Nov. 8, 1975, 2550203

Int. Cl.[2] F16K *31/02*

U.S. Cl. 251—133 **12 Claims**



1. In an oscillating slide valve including a slide plate, a drive device for operating the slide plate, means defining a fluid flow passage and presenting a planar sealing surface surrounding the passage, a first mechanism connected between the drive device and the slide plate for moving the slide plate, in response to movement of the drive device, between a valve opening position in which the slide plate is displaced laterally from the fluid passage and a valve closing position in which the slide plate is interposed in the flow passage, and means for pressing the slide plate against the sealing surface when the plate is in its closing position, the improvement wherein: said means are connected to be driven by said drive device and comprise a second mechanism connected for moving said slide plate perpendicular to said sealing surface and against said sealing surface only after said slide plate has come to rest in said closing position; said drive device comprises a single drive motor and two control elements each connected to be driven by said motor and each presenting a circular control portion and a spiral control portion; and each said mechanism comprises a respective lever operatively associated with, and positively guided by, the control portions of a respective one of said control elements.

4,089,506

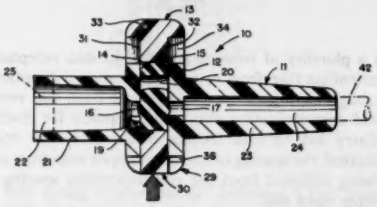
GATE VALVE

Larry Webster Blake, Costa Mesa, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Jan. 24, 1977, Ser. No. 761,602

Int. Cl.[2] F16K *3/28*

U.S. Cl. 251—196 **22 Claims**



1. A gate valve for a catheter comprising an elongated valve body having a transversely extending slide chamber defined in part by a pair of longitudinally spaced valve surfaces, said pair of valve surfaces having longitudinally aligned inlet and outlet ports, respectively, a slide member slidably supported in said slide chamber for transverse sliding movement between first and second positions, said slide member having an enlarged opening extending therethrough in a direction longitudinally of said valve body, and a resilient insert element carried within said opening and being longitudinally movable and self-adjustable therein, said resilient insert element having a longitudinal dimension in an uncompressed state greater than the distance between said valve surfaces being disposed within said slide chamber in a state of longitudinal compression, said resilient insert element having a longitudinal bore in alignment with said inlet and outlet ports when said slide member is in its first position and having surfaces sealingly engageable with said valve surfaces around said inlet and outlet ports when said slide member is in both of its positions.

4,089,507

METHOD AND APPARATUS FOR MAINTAINING UNIFORMITY OF MIXED DUST SLURRY STORED IN A BASIN

Izumi Arai, Chigasaki; Yasuteru Yamada; Akio Mutsuta, both of Wakayama; Hirotoshi Hirano, Isehara, and Yasuzou Tuchida, Osaka, all of Japan, assignors to Sumitomo Heavy Industries, Ltd., Tokyo and Sumitomo Metal Industries, Ltd., Osaka, both of, Japan

Filed Mar. 15, 1976, Ser. No. 667,028

Int. Cl.[2] B01F *7/16, 15/00*

U.S. Cl. 366—102 **3 Claims**

1. An apparatus for storing a slurry of dust from a steel mill for use in manufacturing pellets comprising:

(a) a basin having a bottom wall;

(b) an elongated shaft supported in said basin for rotation about a longitudinal, vertical axis, said shaft having an upper portion and a lower portion;

(c) rake means mounted on the lower portion of said shaft for rotation therewith in said basin;

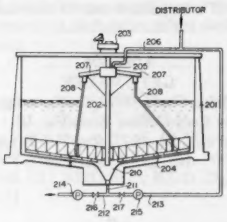
(d) fluid injecting means for injecting fluid into said basin

closely adjacent said bottom wall, said injecting means including a plurality of nozzles; and

(e) drive means for rotating said shaft about said axis;

(f) a receptacle mounted on said upper portion for rotation therewith;

(g) feed means for feeding slurry to said receptacle during said rotation; and



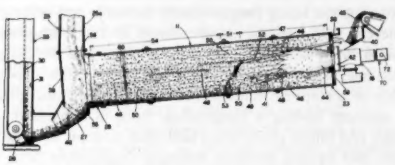
(h) a plurality of troughs attached to said receptacle and extending therefrom in a radially outward direction, each trough having an open end remote from said receptacle and communicating with said receptacle for discharging slurry fed by said feeding means from the open end thereof, the spacing of one of said open ends from said axis being different from the corrresponding spacing of another open end.

4,089,508

METHOD OF PROCESSING BITUMINOUS PAVING MIXTURES AND APPARATUS THEREFOR

Willie E. Anderson, Alliance, Ohio, assignor to Alliance Industries, Inc., Alliance, Ohio

Filed Feb. 18, 1976, Ser. No. 658,903
Int. Cl.² B28C *1/22*
U.S. Cl. 366—7 **12 Claims**



1. In a method of processing bituminous paving mixture to reduce the discharge of aggregate fines into the atmosphere, the steps of:

(a) providing a substantially airtight inclined drum mixer having an upper charging end and a lower discharge end;

(b) moving a heated gas stream with a velocity of from 240 to 540 feet per minute along the drum from a zone adjacent the charging end to the discharge end;

(c) feeding aggregate having a variable moisture content into the drum at the charging end;

(d) immediately heating the introduced aggregate by the heated gas stream to dry the aggregate and produce steam from the aggregate moisture content;

(e) tumbling and moving the heated aggregate along the drum toward the discharge end in the heated steam-containing gas stream;

(f) feeding a liquified asphalt composition into the tumbling heated aggregate moving through the drum at a zone generally intermediate the charging and discharge end of the drum;

(g) continuing the tumbling of the aggregate and liquified asphalt moving in the heated gas stream along the drum to coat the aggregate with the liquified asphalt;

(h) then discharging the coated aggregate from the lower discharge end of the drum;

(i) meanwhile controlling the air-fuel flow ratio of combusion producing the heated gas stream such that nearly all oxygen is consumed during combustion to generally eliminate free oxygen from the low-velocity heated gas stream moving through the drum;

(j) partially obstructing the moving aggregate and heated gas stream by placing shield means in the path of said aggregate and gas stream adjacent the discharge end of the drum to collect small particulate matter; and

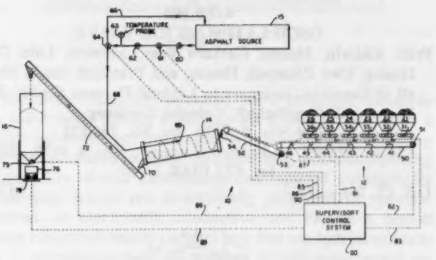
(k) discharging the heated gas stream from the drum discharge end through a natural draft stack with a velocity of from 425 to 900 feet per minute, whereby this velocity of the discharged gas stream in the stack is insufficient to entrain aggregate fines therein and whereby said fines are contained in the discharge coated aggregate.

4,089,509

COMPOSITION CONTROL SYSTEM FOR AN ASPHALT PLANT

James L. Morton, Eden Prairie, Minn.; Thomas H. Birchell, Livermore, Calif.; James M. Noble, Alamo, Calif., and David W. Jenson, Lafayette, Calif., assignors to Seltec Corporation, Fremont, Calif.

Filed Jul. 5, 1977, Ser. No. 813,067
Int. Cl.² B28C *7/04*
U.S. Cl. 366—8 **19 Claims**



5. An asphalt plant comprising:

a mixing drum;

conveyor means for delivering aggregate to said mixing drum including a plurality of feed bins for delivering aggregate of varying grades of coarseness onto said conveyor;

means for delivering liquid asphalt to said mixing drum;

first sensing means including a plurality of scales operatively associated with said conveyor downstream of each location along said conveyor at which a feed bin delivers aggregate to said conveyor for sensing the weight of aggregate being delivered from each of said plurality of feed bins; and

control means operatively connected between said sensing means and said aggregate delivery means for

storing signals from each of said scales for a time equal to the time required for the aggregate corresponding to said stored signal to travel on said conveyor .o the next downstream scale;

subtracting said stored signal from the signal transmitted by said next downstream scale to accurately determine the weight of aggregate added to said conveyor by the feed bin located between said scales;

comparing the proportionate weight of aggregate being delivered from each of said feed bins to a predetermined desired proportion for each feed bin; and,

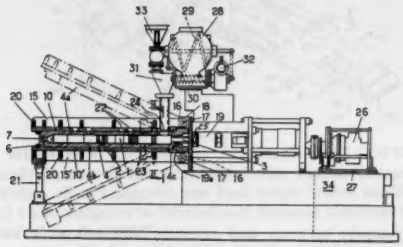
responsive to said actual proportion being other than said desired proportion, adjusting the rate of delivery of aggregate from each of said disproportionate feed bins to the desired proportion.

4,089,510

SCREW EXTRUDER

Jacques Picard, Teheran, Iran; Marc Saunier, Saint Medard en Jalles, and Jean L. Tranchant, Vert le Petit, both of France, assignors to Societe Nationale des Poudres et Explosifs, France

Filed Sep. 20, 1976, Ser. No. 724,999
Claims priority, application France, Oct. 1, 1975, 75 30099
Int. Cl.[2] B29B *1/10*; A29C *1/06*
U.S. Cl. 366—83 **16 Claims**



1. A screw extruder having a bed, two extrusion screws mounted for rotation about parallel axes, and a screw casing connected at one end to the bed, the casing comprising two portions connected together longitudinally by connecting elements, at least one of the casing portions being hinge-articulated with respect to the bed, and the connecting elements being adapted to release the connection between the casing portions, in use, at a predetermined casing pressure to allow said at least one casing portion to articulate to thereby open said casing and wherein the casing portions are connected together along a joint surface passing substantially through the longitudinal axis of the casing, said at least one casing portion being articulated with respect to the bed about an axis which is substantially parallel to said joint surface and perpendicular to said casing axis.

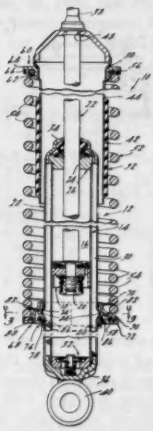
4,089,511

VEHICLE SUSPENSION DEVICE

Dale A. Palmer, Monroe, Mich., assignor to Monroe Auto Equipment Company, Monroe, Mich.

Division of Ser. No. 542,618, Jan. 20, 1975, Pat. No. 4,030,713.
This application Oct. 29, 1976, Ser. No. 736,829
Int. Cl.[2] F16F *13/00*
U.S. Cl. 267—8 R **4 Claims**

1. A vehicle suspension device comprising,
a telescopic shock absorber including an elongated tubular housing,
a piston reciprocally disposed within said housing and connected to one end of a piston rod extending axially outwardly from one end of said housing,
attachment means on the outer end of said piston rod and one end of said housing for securing said device to the sprung and unsprung portions of an associated vehicle,
a tubular dirt shield supported on said one end of said piston rod and extending coaxially of said rod and said housing,
said dirt shield being larger in diameter than said housing and adapted to telescopically receive the adjacent end of said housing therewithin,
a variable rate helical coil spring extending coaxially of said housing and said dirt shield, with said dirt shield being disposed substantially entirely within said coil spring, said spring having a relatively non-laterally flexible section comprising a greater number of convolutions per unit length at one axial portion thereof and a relatively laterally flexible section comprising a lesser number of convolutions per unit length at another axial portion thereof, with said relatively laterally flexible section being disposed adjacent said dirt shield such that said dirt shield will prevent said relatively laterally flexible section of said spring from possibly engaging and damaging said piston rod, and
first and second spring support means for operatively supporting said spring on said sock absorber,



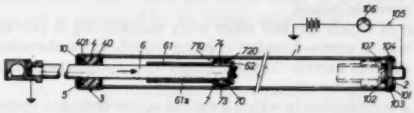
said first spring support means including a first generally radially outwardly extending flange mounted on said dirt shield and said second support means including a second generally radially outwardly extending flange mounted on said housing.

4,089,512

PNEUMATIC SPRINGS AND OTHER TELESCOPIC SYSTEMS

Fernand Michel Allinquant, 53, Avenue Le Notre, and Jacques Gabriel Allinquant, 12, Avenue Arouet, both of 92-Sceaux, France

Filed May 24, 1976, Ser. No. 689,603
Claims priority, application France, Dec. 15, 1975, 75 38295
Int. Cl.[2] F16F *9/18*
U.S. Cl. 267—65 R **14 Claims**



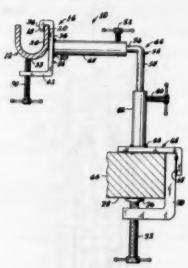
1. A telescopic type pneumatic spring comprising:
a gastight cylinder filled with pressure gas;
a plunger rod sealingly telescoping into said cylinder and presenting an inner end portion inside the same;
two axially-spaced stops fast with and protruding radially from said inner end portion of said plunger rod;
a piston slidably fitted on said inner end portion intermediate said axially-spaced stops for restricted axial displacement relative to said plunger rod limited by abutment of said piston against one or the other of said two stops, said piston subdividing said cylinder into two chambers and presenting;
two opposite annular end faces respectively bounding said cylinder chambers; and
passage measn formed through said piston and leading to openings at said end faces thereof for intercommunicating said cylinder chambers, at least one of said openings being partially obstructed by the adjacent one of said two axially-spaced stops when said piston abuts against it.

4,089,513

HOLDING CLAMP MEANS FOR LOCKING PLIERS

Raymond F. Mack, R.R. 7 - Box 20, Greenfield, Ind. 46140

Filed Feb. 10, 1977, Ser. No. 767,532
Int. Cl.[2] B25B *5/16*
U.S. Cl. 269—96 **6 Claims**



1. A holding clamp means for releasably but securely holding an associated pair of locking pliers, thereby providing that they may serve as a bench-mounted clamp or vise, comprising:

the clamp means being provided with two bearing means respectively bearingly engageable with one of the opposed side faces of one of the walls of one of the handle members of the locking pliers;

a movable means;

the clamp means also being provided with means movably supporting the movable means in and between a non-clamping position and a clamping position in which it bears against said handle member of the said locking pliers;

the arrangement being such that at least a triple support bearing engagement of the said handle member is achieved, respectively by the aforesaid two bearingly engageable means of the clamp means bearing against the said handle member wall side faces, and the third by the said movable means bearing against the said handle member as aforesaid;

in which the clamp means is provided by a body member of a general L-shape, one leg of which provides or carries both of the said first two supports and the other leg of which provides or carries the movable support of the leg movable means;

and in which the said other body member leg is provided with a screw-threaded opening which screw-threadedly receives a screw threaded means which comprises the said movable means;

in a combination in which a second screw-threaded opening is provided in said other body member leg, at a distance from said first body member leg other than is the said first-designated screw threaded opening, thereby providing that the two said openings are optionally selectable to obtain a location of the said screw threaded movable means which causes its bearing engagement with the said pliers handle to be at whichever location is better depending upon the size and shape of the said pliers handle.

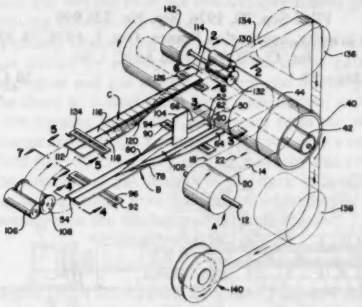
4,089,514

PAPER FOLDING APPARATUS

James Ernest Skipworth, 2128 Windrock, El Paso, Tex. 79925

Filed Sep. 7, 1976, Ser. No. 720,610
Int. Cl.[2] B65H *45/22*
U.S. Cl. 270—94 **12 Claims**

6. Apparatus for folding an elongated web of paper moving longitudinally comprising; first and second spaced folding devices through which a web of paper passes successively for imparting different longitudinal folds thereto, said first folding device having entrance and exit ends, said exit end having a width approximately one-half the width of said entrance end, said first folding device including a pair of spaced elongated channels having longitudinal openings positioned in facing opposed relationship at said entrance end and being positioned facing outwardly in opposite directions at said exit end, and



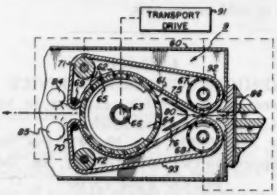
said channels between said entrance and exit ends being twisted approximately 180° and transversely displaced, said second folding device being spaced after said first folding device to fold said web further.

4,089,515

DOCUMENT STORAGE AND TRANSPORT APPARATUS

Klaus K. Stange, Pittsford; Richard E. Smith, Webster; Thomas J. Hamlin, Macedon, and James R. Cassano, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 649,388, Jan. 15, 1976, abandoned. This application May 6, 1977, Ser. No. 794,483
Int. Cl.[2] B65H *5/22*
U.S. Cl. 271—3 **1 Claim**



1. Apparatus for storing and feeding selected sides of selected documents past an exposure station for copying the documents comprising:

(a) document exposure drum means providing said exposure station;

(b) a rack having a plurality of superposed pockets for storing documents;

(c) means for moving any selected one of said pockets to a predetermined location adjacent said document exposure drum;

(d) fluidic means for fluidicly moving a selected document into or out of a selected pocket and into and out of said document exposure drum means at said predetermined location including a plurality of fluid apertures associated with said pockets;

(e) said document exposure drum means including means for receiving a document moved out of a selected pocket at said predetermined location, means for moving a received document through an arcuate path, and means for discharging the document back into said same pocket by said fluidic means;

(f) wherein said document exposure drum includes a rotatable drum, means for providing a vacuum pressure for holding a document on an arcuate surface section of said

drum, and means for rotating said drum to move a document through said arcuate path to and from said selected pocket;

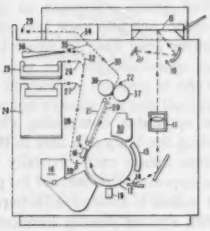
(g) wherein said means for rotating said drum includes means for selectively reversing the rotation of said drum to selectively return a document to the selected pocket in the same or inverted orientation from which it was received from said pocket.

4,089,516

MULTIBIN, CUT-SHEET XEROGRAPHIC COPIER

Donald Francis Colglazier; John Leslie Fallon; Ernest Paul Kollar, all of Longmont, and Fred Ralph Mares, Boulder, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 18, 1977, Ser. No. 788,471
Int. Cl.[2] B65H 1/22
U.S. Cl. 271—9 48 Claims



44. A sheet fed xerographic device capable of selectively operating in a simplex or a duplex copy mode, having at least one paper supply drawer and a duplex bin wherein side-one copied sheets are stored prior to side-two copying, and having logic control means operable to control the xerographic process, including the serial feeding of sheets from said paper supply drawer or said duplex bin to a transfer station, said duplex bin comprising:

a fixed position, substantially horizontal surface member adapted to support side-one copied sheets;

a normally open sheet drive nip mounted forward of said surface member, and adapted to receive side-one copied sheets and to feed them to said transfer station;

a movably mounted combing wheel overhanging said surface member so as to cooperate with the top sheet of paper in the duplex bin, said combing wheel being spaced downstream from said sheet drive nip, and normally being raised from said surface member to facilitate the depositing of side-one copied sheets in said duplex bin as these sheets enter from above through the space between said sheet drive nip and said combing wheel;

sheet sensing means mounted so as to sense a sheet within said sheet drive nip;

combing wheel control means controlled by said sheet sensing means upon a need to feed side-one copied sheets to said transfer station and operable to control movement of said combing wheel to shingling engagement with the top sheet in said duplex bin in the absence of a sheet at said sensor, and away from said shingling engagement with the top sheet in the presence of a sheet at said sensor; and

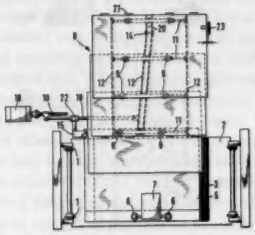
means operable to close said drive nip upon the need for a sheet at said transfer station for side-two duplex copying.

4,089,517

SHEET FEEDER WITH CORRECTION FOR SHEET OFFSET

Josef Marass, Seehausen, Germany, assignor to Georg Spiess GmbH, Gersthofen, Germany

Filed Oct. 19, 1976, Ser. No. 733,789
Claims priority, application Germany, Oct. 24, 1975, 2547788
Int. Cl.[2] B65H 7/12
U.S. Cl. 271—13 2 Claims



1. A sheet feeder comprising a feed table provided with sheet feeding means for the stream feeding of individual sheets from a stack of sheets over the feed table, conveying means being laterally displaceable towards both sides in the feeding plane with reference to the normal conveying direction for correcting the lateral position of sheets lying in an offset stack, the conveying means comprising laterally displaceable suckers arranged longitudinally of the feed path therebelow to engage a sheet from below, the conveying means comprising a longitudinal guideway pivotally mounted adjacent one end thereof in an end portion of the feed table to be swingable about a pivot in a horizontal plane and determine by its position in that plane the amount of lateral displacement of a sucker at any place along the feed table, the angular position of the guideway being adjustable by a servo-motor acting on a spindle, said conveying means being pivotable in each case before receiving a sheet and according to the lateral offset of the sheets, and a lateral edge sensor for measuring the lateral offset of the sheet to be received by the conveying means and for automatically controlling the servo-motor which in turn adjusts the pivoting movement of the conveying means before each receipt of a sheet in accordance with the lateral offset of the sheet to be received as measured by the lateral edge sensor.

4,089,518

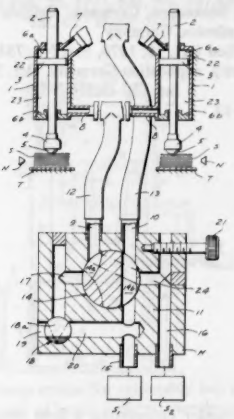
SHEET-HANDLING APPARATUS

Karl-Hans Vollrath, Leipzig, Germany, assignor to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany

Continuation-in-part of Ser. No. 771,797, Feb. 24, 1977, abandoned. This application Jun. 10, 1977, Ser. No. 805,392
Claims priority, application Germany, Feb. 24, 1976, 6519143
Int. Cl.[2] B65H 3/34
U.S. Cl. 271—167 11 Claims

1. In a sheet-handling apparatus, a device for holding down sheets which are stacked on a support, comprising an upright cylinder mounted above said support and containing a slidable piston which defines with said cylinder an upper and a lower cylinder chamber and a piston rod extending from said piston through said lower cylinder chamber and having an end portion adapted to exert pressure upon sheets on said support; first and second conduit means communicating with said upper and said lower cylinder chamber, respectively; a suction channel

and a compressed-gas channel; valve means for selectively connecting the respective conduit means with one or the other



of said channels; and regulating means for regulating the pressure prevailing in said conduit means and cylinder chambers.

4,089,519

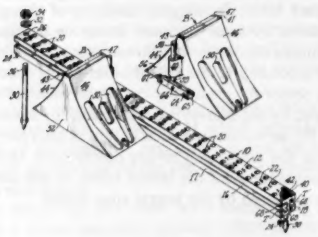
STARTING BLOCK ASSEMBLY

Milton A. Newton, Jr., 877 Kincaid St., Inglewood, Calif. 90302

Continuation-in-part of Ser. No. 657,705, Mar. 5, 1976, abandoned. This application Feb. 28, 1977, Ser. No. 772,770

Int. Cl.[2] A63B *69/00*

U.S. Cl. 272—105 **1 Claim**



1. A starting block assembly comprising, in combination:

an elongated frame adapted for location at the start of a running track and having an upper surface with a longitudinal series of socket means individually spaced apart therealong, plus a mutually parallel pair of upright walls disposed one adjacent each longitudinal side thereof, each such side wall characterized by a side opening of a generally T-shape track extending lengthwise along the frame, the cross arm of each said T-shape track being vertical and forming upper and lower portions,

a pair of generally triangularly shaped, foot-contact blocks, each having an opposing pair of upstanding concave faces disposed transverse to said frame, one concave face being formed with a pattern of spike-receiving openings and the other concave face bearing a resilient contact surface, each block carrying a tensioned anchorage pin for tensioned engagement with individual socket means of said series to anchor the block at a selected position,

each block carrying an elongated laterally-extending, generally L-shaped runner inserted through an adjacent one of said side openings said L-shaped runner consisting of a horizontal arm and a vertical arm extending upwardly from said horizontal arm movably occupying only said upper portion of said T-shaped track, being lengthwise slidable linearly therealong together with its block upon disengagement of said anchorage pin from the socket means, and upon such disengagement said block and runner as a unit being selectively, transversely rockable along the longitudinal axis of the track so as to dislodge contacting particles of dirt and the like from the upper portion of said track and allow them to drop into the lower portion thereof.

4,089,520

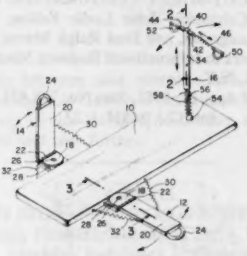
PLATFORM EXERCISE APPARATUS WITH SPRING TENSIONED ARM AND LEG EXERCISE ASSEMBLIES

Ahmet Ozbey; Amber L. Ozbey, and Suzan N. Ozbey, all of 8221 Clay Dr., Oxon Hill, Md. 20022

Filed Sep. 8, 1976, Ser. No. 721,423

Int. Cl.[2] A63B *21/04*

U.S. Cl. 272—136 **7 Claims**



1. An exercise apparatus comprising elongated platform means for supporting the body of a user in the prone position, hinged arm exercise means each pivotally mounted on said platform means at opposite sides thereof for pivotal movement about a first axis which is substantially parallel and substantially coplanar with a plane passing horizontally through the platform means the longitudinal axis of said platform means, said arm exercise means extending laterally from said platform means, spring tension means connected to oppose pivotal movement of said arm exercise members in at least one direction about said first axis, and a leg and abdominal exercise means mounted on said platform and extending upwardly therefrom in spaced relationship to said arm exercise members to receive the feet of a user during an exercise program, said leg and abdominal exercise means being mounted for universal pivotal movement relative to said platform means.

4,089,521

TENNIS STROKE TRAINER

Theodore H. Berst, 1214 S. Hamilton St., and Paul A. Meyers, 1415 West St., both of Lockport, Ill. 60441

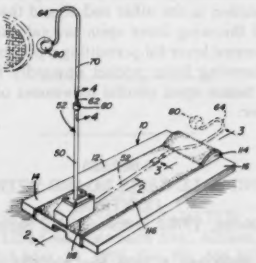
Filed Aug. 25, 1976, Ser. No. 717,585

Int. Cl.[2] A63B *69/38*

U.S. Cl. 273—29 A **7 Claims**

1. A device for use with a tennis racket in improving tennis strokes, said device including a base, a standard having its lower end pivotally supported on said base for angular displacement about a horizontal axis and oscillation of said standard between a substantially upright static rest position and a generally horizontally disposed position, means operably connected between said base and said standard yieldingly biasing said standard toward said rest position, a rebounding portion of said base spaced laterally of said axis including a raised upwardly facing cushion against which the free end portion of said standard abuts when said standard is in said horizontal position, the upper end portion of said standard including a reversely bent downwardly directed portion terminating downwardly in a horizontally outwardly directed terminal end facing in a direction away from said standard opposite to the direction said cushion is spaced from said axis, said terminal

end having a resilient object ball stationarily mounted thereon, said base being horizontally elongated and one end thereof has an upstanding opening formed therethrough, a hollow downwardly opening mount secured to said base over the upper end of said opening and having an upstanding slot formed therein opening upwardly through said mount and horizontally outwardly of the latter toward the other end of said base, said lower end of said standard projecting downwardly through said slot and said opening and being swingable through said



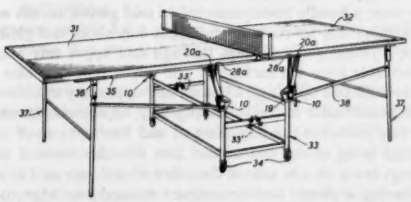
slot, said cushion being mounted on said other end of said base, said means yieldingly biasing said standard toward said rest position including an expansion spring having one end anchored relative to said base and the other end operatively connected to said standard, said base defining an elongated downwardly opening and longitudinally extending channel opening into said upstanding opening at one end of said channel, said spring having a major portion thereof received in said channel.

4,089,522

HINGE ASSEMBLY

Kenneth Maclean Rock, 81 Richmond Road, Morningside, Queensland 4170, Australia

Filed Aug. 15, 1975, Ser. No. 605,150
Claims priority, application Australia, Aug. 16, 1974, 8548/74
Int. Cl.[2] A63B *39/00*
U.S. Cl. 273—30 **4 Claims**



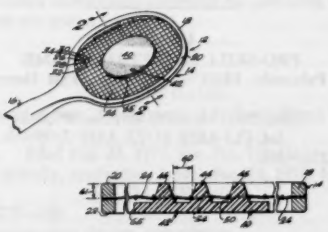
1. A hinge mechanism connecting a panel assembly to a support frame and operative to guide said panel assembly for pivotal movement about a transversely extending axis between a stowed upright attitude in which said panel assembly is positioned adjacent a vartically extending datum plane disposed parallel to said axis and at the side of said panel remote from said hinge mechanism and in which stowed attitude said panel assembly has a lowermost edge and an uppermost edge, to an operative position in which said panel assembly extends substantially horizontally and is positioned with said lowermost edge substantially contained in said datum plane and said uppermost edge disposed at the side of said hinge mechanism remote from said lowermost edge, said hinge mechanism including an elongated linkage member pivotally connected at one end to the panel assembly and pivotally connected at its other end to the support frame, and control means therefor, said control means including a control stay pivotally connected at a fixed point to the panel assembly and pivotally connected with the support frame and the linkage member, the support frame having a control slot and the linkage member having an elongated cut-out, said control slot has a first portion extending parallel to said cut-out when said linkage member is disposed so as to support said panel assembly in its operative attitude, and a second arcuate portion extending about the pivotal connection between said linkage member and said support frame said last named pivoted connection comprising a bearing assembly on the control stay said bearing assembly extending through and slidable along said control slot and said cut out, said control stay being functional to allow movement of said bearing assembly along said cut-out and said first portion of said control slot, thus preventing pivotal movement of said linkage member relative to said support frame, to said second arcuate portion of said support frame, to said second arcuate portion of said control slot in which said pivotal movement between said linkage member and said support frame is permitted, the relation of said bearing assembly, control slot and cut-out being such that, during initial pivoting of the panel assembly from its operative position to its stowed position, the panel assembly pivots only about its connection at said one end of the linkage member, to move said bearing assembly along said cut-out and said first portion of said control slot whereafter said bearing assembly enters said second portion of the control slot so disposed as to permit the linkage member to move pivotally around the connection of its other end to the support frame while the panel assembly moves to its stowed attitude adjacent said datum plane.

4,089,523

ALIGNING TOOL FOR STRINGS OF RACKET

Susan Newburger, and John D. Keaney, both of R.F.D., Concord, Vt. 05824

Filed May 5, 1975, Ser. No. 573,890
Int. Cl.[2] A63B *69/38*
U.S. Cl. 273—73 R **13 Claims**



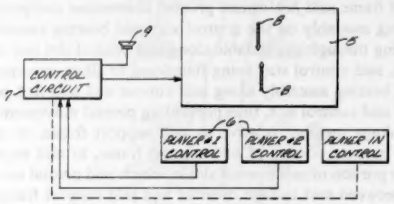
11. In combination, a strung racket and string aligning tool therefor, said racket having a head and a plurality of strings supported thereby, said strings being arranged into a number of substantially parallel main strings and a number of substantially parallel cross strings wherein said cross strings are transverse to said main strings to define a grid pattern of regularly spaced openings therebetween, said aligning tool including a base, a plurality of upstanding alignment fingers supported by said base, each of said alignment fingers has a horizontal profile corresponding to the opening formed by said strings, said alignment fingers being arranged according to said grid pattern and being spaced apart defining intersecting continuous slots to receive said strings therebetween, whereby displaced strings are urged to realignment to restore said grid pattern when said alignment device is forced into mesh with said strings.

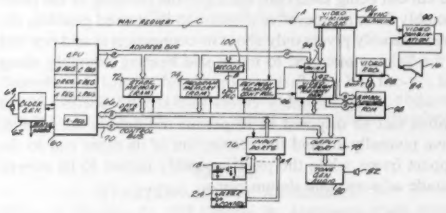
4,089,524

DIGITALLY CONTROLLED ELECTRONIC GAME

Lane T. Hauck, San Diego, Calif., assignor to Gremlin Industries, Inc., San Diego, Calif.

Filed Jan. 18, 1977, Ser. No. 760,470
Int. Cl.[2] A63F *9/14*; G06F *3/14*; G06K *15/20*
U.S. Cl. 273—85 G **24 Claims**





5. An electrical game apparatus comprising:

means generating a plurality of moving visual images on a display field moving at predetermined rate, including means retaining a visual image of the paths traversed by said moving images,

control means for instantaneously changing the direction of movement of any of said moving images on the display field,

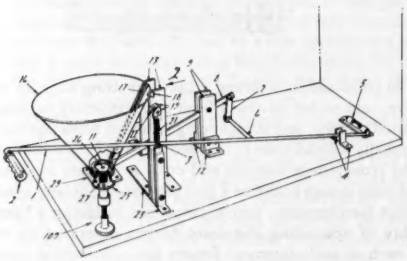
and means interrupting the movement of any one of the moving images when the moving image intercepts the retained image of any of said paths traversed by the moving images.

4,089,525

PRO-SKILL BASKETBALL GAME

Michele Palazzolo, 19251 Stephens Dr., East Detroit, Mich. 48021

Filed Nov. 13, 1975, Ser. No. 597,001
Int. Cl.[2] A63B *65/12*; A63F *7/06*
U.S. Cl. 273—101 **11 Claims**



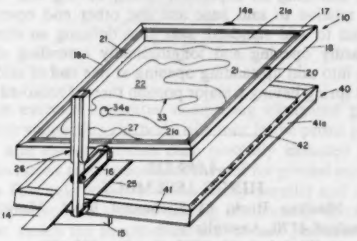
1. A ball throwing game comprising a cabinet having a game floor therein, a back wall and a basket mounted thereon, a throwing lever supported intermediate its ends for pivotal movement about a horizontal axis beneath said game floor, said throwing lever having means defining a pocket at one end of a size and shape to receive and confine a ball prior to throwing thereof, a manually operated lever pivotally supported within said cabinet, said pivot axis of said manually operated lever being disposed adjacent said back wall, said manually operated lever having an integral, perpendicularly disposed operating handle at one end thereof exposed outwardly of said cabinet and sized to be grasped within the hand of a player for pivotally moving said manually operated lever by a player positioned adjacent said cabinet at the end opposite said back wall, and motion transmitting means including means providing a pivotal connection to the other end of said throwing lever for pivoting said throwing lever upon pivotal movement of said manually operated lever for permitting a player to throw a ball from said throwing lever pocket upwardly from said floor toward said basket upon pivotal movement of said manually operated lever.

4,089,526

PIVOTING BALL GAME BOARD WITH GIMBAL CONTROL

Henrik C. Olving, 17703 Oakwood Dr., Spring Lake, Mich. 49456

Filed Apr. 5, 1976, Ser. No. 673,713
Int. Cl.[2] A63F *7/14*
U.S. Cl. 273—110 **1 Claim**



1. A game of skill having a base, said base having a pair of upstanding standards; a lower tray mounted on said base between said standards; an upper tray and gimbal means supporting said upper tray between said standards and above said lower tray; a handle interconnected to said gimbal means and to said upper tray for rocking said upper tray about said gimbal means; a plurality of openings through said upper tray and a ball movable over the surface of said upper tray of a size to pass through said openings; a line on said upper tray to indicate the path said ball is to follow during play; an element forming a starting pocket at the beginning of said line and one of said openings being at the end of said line, all other ones of said openings being on one side or the other of said line; said lower tray having a planar surface inclined toward one edge over which said ball can freely roll, scoring indicia of graduated values on said one edge with the lowest value adjacent the area of said lower tray beneath the exit of said starting pocket and the highest value adjacent the area at the opposite end of said lower tray wherein a plurality of upstanding barriers are provided at various positions along said line, said barriers being rigidly secured to said upper tray and positioned to interrupt movement of said ball, said barriers consisting of a plurality of spaced sections arranged at various angles to each other, certain of said barriers forming a second pocket open at one side around said one opening for restricting access of said ball to said one opening, said gimbal means including a first and second pivot means, wherein said handle is elongated having an upper grip portion and a lower link connecting portion and its point of attachment to said second pivot means being intermediate said portions, said trays being rectangular, having a pair of sides and a front and a back; said handle being at one side of said trays and said one edge of said lower tray being along the

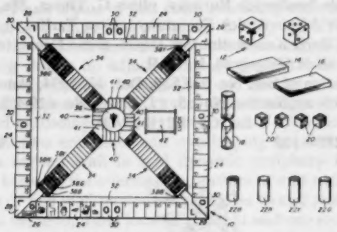
front thereof, wherein a ball trapping pocket is provided on said lower tray aligned with said one opening for receiving said ball when it falls through said opening, said ball trapping pocket being surrounded by a retaining wall such that the sole entrance to said pocket is through said one opening, said ball trapping pocket being located in an area on said lower tray from which said ball would normally roll to a position along said edge having a value intermediate said highest and lowest values.

4,089,527

BOARD GAME APPARATUS

Barry B. Roth, 1251 Commonwealth Ave., Allston, Mass. 02134

Filed Mar. 11, 1976, Ser. No. 666,223
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—249 **15 Claims**



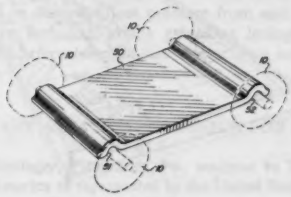
1. A board game apparatus comprising:
a board having marked areas defining a path delineated on the board, one of said marked areas representing a starting area,
a plurality of differently identified playing pieces one for each player,
means usable by a player for determining the number of areas that the respective players shall move along the path,
said marked areas each being individually identified,
means defining a plurality of different information indicia each of which has factual data thereon which is to be memorized, each said information indicia being identified to correspond to a marked area,
a plurality of markers separated into sets corresponding to the number of playing pieces,
said markers each being associated with the marked area where each piece has landed when moved and indicative of the control of that marked area,
timing means capable repetitively of indicating the termination of a precise predetermined period of time only sufficiently long to enable a player to adequately memorize an information indicia that corresponds to the marked area upon which one of the players has landed,
any one of said players when their piece lands on a marked area controlled by another player said another player may request that said any one player recall at least one of said information indicia means corresponding to a marked area controlled by said another player,
said any one player being penalized upon failure to recall,
said any one player being declared a winner after completing said path.

4,089,528

RAFT WITH REMOVABLE WEIGHTED MEMBERS THAT PROVIDE BUOYANCY

William J. Green, Salt Lake City, Utah, assignor to Stanley O. Vogen, Salt Lake City, Utah

Filed Dec. 20, 1976, Ser. No. 752,538
Int. Cl.[2] A63B *11/00*
U.S. Cl. 272—122 **7 Claims**



1. A device comprising:
a first shaft,
a pair of hollow containers, one mounted at each end of said shaft,
each of said containers being provided with an inlet-outlet port and means for opening and closing said port,
said containers each comprising a cylindrical bearing means extending axially thereof for receiving an end of said shaft,
said cylindrical bearing means and the associated end of said shaft being provided with interlocking means for orienting each of said containers and its port in similar positions on said shaft,
said means for opening and closing the port of each container comprising a resilient tab fixedly mounted at one end on said container and provided with a resilient plug at its other end for insertion into said port for sealing it,
whereby said port may be opened by lifting the plug end of said tab away from said port and the containers partially or completely filled with water to vary the weight of the containers at each end of the shaft,
second shaft and containers in combination identical in structure to the first shaft and containers and spacedly positioned in a parallel coplanar arrangement with the first shaft and its containers, and
platform means extending over the shafts of the device and removably interlocking therewith for providing a raft for use on the water.

4,089,529

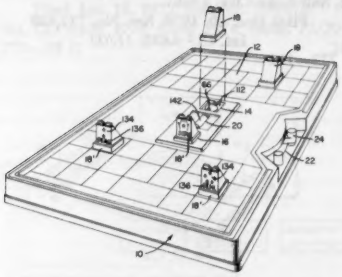
BOARD GAME

Hikoo Usami, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Feb. 25, 1977, Ser. No. 772,136
Claims priority, application Japan, Jun. 10, 1976, 5168583
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—282 **9 Claims**

1. An amusement device, comprising:
a housing provided with a window and two openings,
a slide mechanism, coding means provided on said slide mechanism, and means mounting said slide mechanism to move with respect to said housing such that different portions of said coding means may be exposed through said window,
bars, means mounting said bars to said slide mechanism, means connecting said bars such that movement of one of said bars in one direction causes the other of said bars to move in the opposite direction,
wheels associated with said bars, means mounting said wheels to said housing for rotation, posts extending from said wheels through said openings, and means connecting said bars and said wheels such that movement of said bars causes said wheels to rotate,
operating means for moving said slide mechanism, and

a plurality of playing pieces associated with each of said wheels, said playing pieces being provided with indicia and flanges that block movement of said posts when said



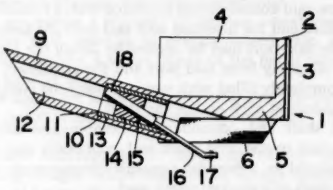
playing pieces are positioned within said openings of said housing, said flanges of different playing pieces being oriented differently to stop said posts at different positions and coordinated with said indicia and said coding means.

4,089,530

PHONOGRAPHIC STYLUS

Hirokazu Kawabe, and Hiroshi Tanabe, both of Tokyo, Japan, assignors to Kabushiki Kaisha Nagaoka, Tokyo, Japan

Filed Dec. 22, 1976, Ser. No. 753,186
Claims priority, application Japan, Oct. 6, 1976, 51-120107
Int. Cl.[2] G11B *3/02*
U.S. Cl. 274—37 **7 Claims**



1. A phonographic stylus to be fitted in a cartridge for a record player comprising: a stylus knob having an integrally formed rearwardly extending holder, said holder having an inner hole therein, said stylus knob being formed of non-magnetic material, a stylus cantilever having a rear end and a stylus tip, and means for attaching said stylus cantilever to said holder, said means comprising an inside hollow holder supported in said inner hole of said holder, and a damper having a mounting hole therein for receiving and supporting said rear end of said stylus cantilever, said damper being molded in place within said inside hollow holder, whereby said damper makes close and uniform distortionless contact with the interior of said inside hollow holder.

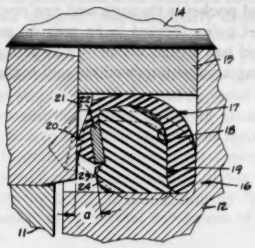
4,089,531

CRESCENT SEAL WITH REINFORCING RING

Robert D. Roley, Peoria, and James R. Sturges, Washington, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Sep. 1, 1977, Ser. No. 829,685
Int. Cl.[2] F16J *15/38*
U.S. Cl. 277—92 **12 Claims**

1. In a track assembly of the type comprising a plurality of pivotally interconnected links and annular sealing means disposed between each adjacent pair of links, the improvement wherein said sealing means comprises an annular elastomeric seal having a crescent-shaped cross section defining an annular groove therein and a lip disposed in sealing contact with a sealing surface defined in said track assembly, an annular elastomeric load ring disposed within the annular groove defined in said seal for urging said lip into sealing contact with said



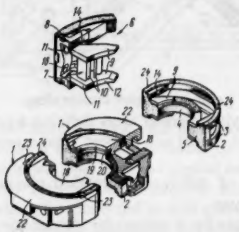
sealing surface and annular reinforcing ring means disposed between the lip of said seal and said load ring for maintaining said lip in intimate sealing contact with said sealing surface upon relative pivoting of said pair of said links.

4,089,532

BLOWOUT PREVENTER RAM ASSEMBLY

Arkady Ivanovich Kamyshnikov, ulitsa Prazhskaya, 12, kv. 79; Alexandr Isaakovich Rutitsky, ulitsa G. Titova, 38a, kv. 64; Vladimir Mikhailovich Speransky, ulitsa Tarifnaya, 23, kv. 47, and Boris Konstantinovich Danin, ulitsa Deputatskaya, 5, kv. 74, all of Volgograd, U.S.S.R.

Continuation of Ser. No. 533,838, Dec. 18, 1974, abandoned.
This application Nov. 3, 1975, Ser. No. 628,423
Int. Cl.[2] E21B *33/06*
U.S. Cl. 277—129 **8 Claims**



1. A blowout preventer ram assembly defined by two identical rams, each ram comprising: a resilient ram rubber constituted by arcuate members of larger and smaller radii, said arcuate members being mounted with a gap therebetween and being interconnected with their end faces by a connecting piece disposed in a plane perpendicular to the direction of ram movement; a ram block arranged in said gap and provided with a projection hanging over said arcuate member of smaller radius; a holder, said holder embracing said ram rubber together with the ram block; rigid rubber-flow control members arranged in said end faces of the ram rubber and the connecting pieces, wherein the same are connected, each of said latter members being constituted by first and second conjugated parts; the first of said conjugated parts being fixed in position on the surface of said arcuate member of smaller radius, facing said projection of the ram block and being a plate having one face parallel to the end face of connecting piece of said ram rubber, a second face of said plate, facing the pipe to be sealed, and being arc-shaped, and a third face of said plate facing said ram block, and being arranged at an angle to said first plate face, with a portion of said ram block being in contact with said third face of the plate and inclined at the same angle with respect to said first face of the plate for sliding camming engagement by said ram block upon movement of the ram to a

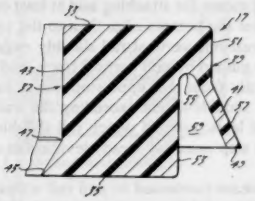
pipe engaging position; the second of said conjugated parts fixed in position in the end face of said arcuate member of larger radius and having a guide for said second part to move in a direction normal to said end face of the ram rubber.

4,089,533

RESILIENT SEAL RINGS WITH DUAL LIPS

Charles B. Knudson, Hillsdale, Utah, assignor to Microdot Inc., Greenwich, Conn.

Filed Aug. 8, 1977, Ser. No. 822,559
Int. Cl.² F16J *9/20, 15/32*
U.S. Cl. 277—152 **7 Claims**



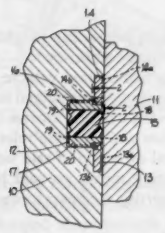
1. A seal to inhibit flow of fluid along a joint between relatively movable parts comprising a body of resilient sealing material having a static seal periphery and a dynamic seal periphery and a pair of end faces extending between the peripheries, said static seal periphery having a wall extending most of the distance between said end faces and an outwardly extending stubby lip adjacent one of the end faces, said dynamic seal periphery having first and second wall sections substantially parallel to each other and to said static periphery wall and extending inwardly toward each other respectively from the two end faces and overlapping between said end faces, a curved wall in said dynamic periphery forming a groove between the overlapping portions of said wall sections, the first of said wall sections being closer to said static periphery than the second and located adjacent said one end face that is adjacent said stubby lip, said dynamic periphery including a thin flexible lip forming an extension of the second wall section and extending in the direction of said one end face and flaring outwardly away from said first wall section.

4,089,534

PACKING ASSEMBLIES

James Albert Frazier Litherland, Walsall, England, assignor to Polypac B.A.L. Limited, Halesowen, England

Continuation of Ser. No. 613,282, Sep. 15, 1975, abandoned, which is a continuation of Ser. No. 530,240, Dec. 6, 1974, abandoned. This application Jun. 16, 1976, Ser. No. 696,501
Claims priority, application United Kingdom, Dec. 29, 1973, 60143/73
Int. Cl.² F16J *15/16*
U.S. Cl. 277—188 A **4 Claims**



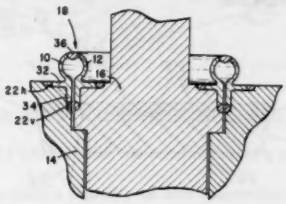
1. In a packing assembly for disposition in an annular groove provided in one of a pair of relatively reciprocating confronting surfaces to seal the clearance between said surfaces, a deformable sealing ring disposed in said annular groove for fluid sealing engagement with the base wall of said annular groove and the opposed confronting surface, and a pair of support ring members respectively disposed on the opposite sides of the sealing ring and confined by the side walls of the annular groove, said support ring members making bearing engagement with the opposed confronting surface and the base wall of the annular groove and having passage means placing the zone between said opposed support ring members in communication with the clearance between the confronting surfaces to leak or dissipate fluid pressure from said zone, said passage means including axially extending leakage grooves formed on the external face of said support ring members.

4,089,535

DUAL-SHANK ATTACHMENT DESIGN FOR OMEGA SEALS

Stanley S. Sattinger, Pittsburgh, Pa., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 25, 1977, Ser. No. 762,365
Int. Cl.² F16J *15/08*
U.S. Cl. 277—236 **8 Claims**



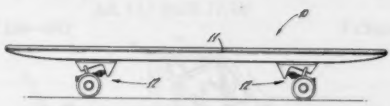
1. An omega seal structure comprising a pair of arc shaped spaced-apart members, each of said members oriented to each other to form approximately one-half of an omega seal and having one end disposed for welding at the apex thereof, each of said members including a first extended shank attachment at the second end respectively disposed for welding to respective first and second support structures, and at least one of said members having a second shank attachment disposed from 45° to 135° to said first shank suitable for welding at the second end to one of said support structures.

4,089,536

WHEEL CARRIAGE ASSEMBLY

Henry Larrucea, 8532 Hamilton, Huntington Beach, Calif. 92648

Filed Apr. 8, 1976, Ser. No. 674,867
Int. Cl.² A63C *17/02*
U.S. Cl. 280—11.28 **5 Claims**



1. A wheel carriage assembly comprising:
a unitary baseplate having an upper plane surface securable to a footplate of a skateboard or the like;
shock absorber means, compressible along an axis thereof;
a pivot arm having first and second ends and including an angulated plate such that said first and second ends are displaced from a common plane, said baseplate having first means therein for receiving said first end of said pivot arm;
said first end including means adapted to permit pivotal movements of said pivot arm (1) about the axis of said

pivot arm in a substantially horizontal plane and (2) along the axis of said shock absorber means in a substantially vertical plane, both of said pivotal movements being against the biasing action of said shock absorber means;

said second end comprising an axle mount;

an aperture located between said first end and the angulation in said angulated plate for receiving said shock absorber means whereby said shock absorber engages said pivot arm intermediate said first end and said angulation;

said shock absorber means including a shaft having first and second ends, said baseplate having second means therein for receiving said first end of said shaft, and first and second biasing means mounted, respectively, at the first and second ends of said shaft; and

said pivot arm being mounted on said shaft between said first and second biasing means for slidable movement along said shaft against the biasing of said first and second biasing means.

4,089,537

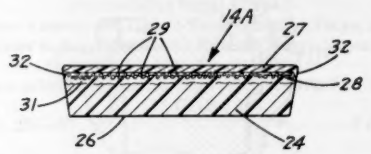
SPLASH SHIELD

James J. Pralutsky, 836 Englewood, St. Paul, Minn. 55104

Filed Jun. 4, 1976, Ser. No. 693,011

Int. Cl.[2] B62D *25/16*

U.S. Cl. 280—154.5 R **10 Claims**



1. A splash shield comprising: a laminated sheet member having a first linear side edge, a second side edge having a linear portion and a concave portion, a top, and a bottom, said sheet member having a flat and flexible base with a top surface, transparent sheet means covering said top surface adhesive material securing said sheet means to the top surface of the base, and colored particles evenly suspended in said adhesive material, said colored particles being visible through said transparent sheet means.

4,089,538

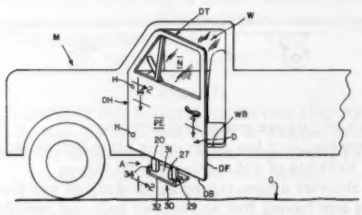
LOWERABLE STEP ASSEMBLY FOR INTERIOR SIDE OF HINGED DOORS

Floyd W. Eastridge, 3514 Stuart Blvd., Council Bluffs, Iowa 51501

Filed Apr. 18, 1977, Ser. No. 788,525

Int. Cl. B60r *3/02*

U.S. Cl. 280—166 **10 Claims**



1. In physical combination with the interior side of a hingedly attached vertical door having a top-edge and a bottom-edge, a lowerable step assembly having a step-on tread pivotably connected to the lower portion of at least one vertical rail slidably engaged with track means therefor, said step assembly being completely disconnected from the doorway framework except secondarily through the door inherent hinged connection thereto, said step assembly having an operative lower-station wherein the step-on tread is horizontal and located well below the opened door bottom-edge and whereat an upperstop means from the rail downwardly abuts the track means, said step assembly having a stowed upper-station wherein the tread is vertical and parallel to the closed door and located wholly above the door bottom-edge, wherein

A. said track means comprises at least one vertical track lying alongside and parallel to the door vertical interior side, said track having a track-height from the track top-end to bottom-end;

B. mounting means for attaching said at least one track to the door nearer the bottom-edge than to the top-edge;

C. said at least one vertical rail slidably engaged with and vertically guided by said vertical track, said rail extending downwardly from said upperstop means having an uninterrupted slidable-extent exceeding the track-height by a ratio of at least two and which rail slidable-extent determines the step assembly tread elevation at said lower-station;

D. handle means connected to said rail whereby the assembly operator might manually initiate the said at least one rail and pivotably associated tread to ascend from lower-station to upper-station;

E. Releaseable holding means located loftily above the door bottom-edge to maintain the rail and tread at upper-station and which when released allows the rail and tread to descend gravitationally to lower-station; and

F. automatic pivot control means to cause the step-on tread to automatically pivot from horizontal to vertical as the at least one rail is caused to ascend from lower-station to upper-station.

4,089,539

APPARATUS FOR SUPPORTING DEMOUNTABLE FREIGHT CARRIERS ON VEHICLES

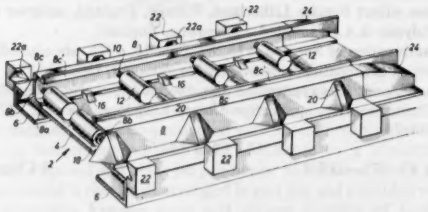
Gunvald Magnus Svante Berger, Helmfeltsgatan 4 A, S-211 48 Malmo, Sweden

Filed Aug. 2, 1976, Ser. No. 710,602

Claims priority, application Sweden, Aug. 4, 1975, 7508785

Int. Cl.[2] B60P *7/00*

U.S. Cl. 280—179 R **9 Claims**



1. A carrying frame for supporting freight carriers demountable from a vehicle which comprises

a bottom portion carried by said vehicle;

two substantially identical, longitudinal supporting elements adapted for receiving a freight carrier thereon situated on said bottom portion and movable relative to said bottom portion in a lateral direction of said vehicle;

reciprocating adjusting means on said bottom portion for moving said supporting elements to a predetermined position; and

restraining means for retaining said freight carrier on said supporting elements and in a fixed position relative to said bottom portion;

said reciprocating adjusting means including spaced first and second means for displacing said longitudinal supporting

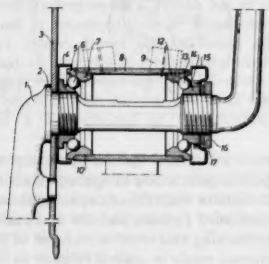
elements first in one lateral direction and then in the opposite lateral direction from said one lateral direction.

4,089,540

CRANK BEARING DEVICE FOR PEDAL VEHICLES

Sten Ivar Helmer Liljequist, Varberg, Sweden, assignor to Monark-Crescent AB, Varberg, Sweden

Filed Oct. 15, 1976, Ser. No. 732,932
Claims priority, application Sweden, Oct. 24, 1975, 7511914
Int. Cl.[2] B62M *3/00*; F16C *13/02*
U.S. Cl. 280—259 1 Claim



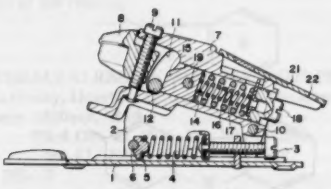
1. A crank-bearing device for pedal vehicles comprising a cylindrical crank-bearing shell having a central axis connected to the vehicle frame, crank means having an arm passing axially through by the bearing shell, a ball bearing bushing on each end of the crank arm passing through the shell, cone means attached onto the crank with a plurality of ball bearings, positioned between said ball bearing bushing and said cone, a cylindrical outer surface of said ball bearing bushing cooperating with a cylindrical inner surface of said crank-bearing shell, and a plurality of low, protruding ribs formed at spaced intervals on said bushing parallel to said axis, said bushing being mounted in said crank-bearing shell by driving the ball-bearing bushing into the shell, thereby forcing said ribs into the material of the shell in order to connect these two parts with each other.

4,089,541

SKI BOOT HEEL BINDING HAVING IMPROVED UNLOCKING DEVICE

Masahiro Murata, Matsudo, Japan, assignor to Hope Co. Ltd., Japan

Filed Jan. 28, 1977, Ser. No. 763,417
Claims priority, application Japan, Oct. 26, 1976, 51-143111
Int. Cl.[2] A63C *9/08*
U.S. Cl. 280—631 5 Claims



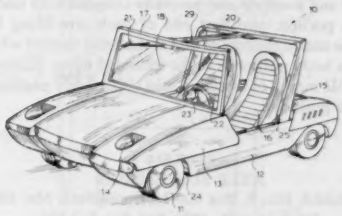
1. A ski boot heel binding comprising support means, a main body having boot heel engaging means at the forward end thereof and a bore formed therethrough in the lengthwise direction thereof, means pivotally mounting said main body on said support means, a cam member slidably disposed within said bore, a cross bar located forwardly of said cam member and fixedly mounted on said support means, yieldable means for urging said cam member forwardly against said cross bar, an unlocking lever pivotally connected at the front end portion thereof to said cam member and having an inclined shoulder at the upper portion thereof, a fulcrum pin fixed to said support means and in contact with said inclined shoulder of said lever, whereby when the rear end of said unlocking lever is lifted, relative movement between said pin and said shoulder results in a shifting of the fulcrum point of the leverage causing said cam member to retract along said bore and release the engagement of said cam member with said cross bar.

4,089,542

COLLAPSIBLE VEHICLE

William J. Westerman, 2625 W. 4th St., Waterloo, Iowa 50701

Filed Aug. 16, 1976, Ser. No. 714,339
Int. Cl.[2] B62B *11/00*
U.S. Cl. 280—639 20 Claims



1. A foldable vehicle comprising in combination:

a chassis;

a plurality of wheels, each mounted to one of a plurality of axles;

at least one seat; a plurality of axle suspending members, each member having a bell crank pinned between its ends to said chassis and having one axle attached to at least one arm of one said bell crank;

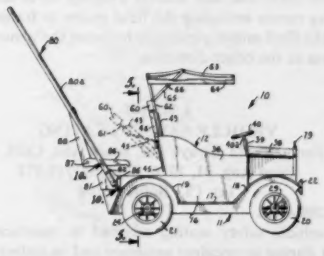
means for lowering said chassis relative to said wheels from an erected position to a folded position, said means including means for locking said wheels in an operative position for movably supporting said chassis; and at least one folding lever movably attached to said chassis and connected to a second arm of each of said plurality of bell cranks through a plurality of tie rods connecting said folding lever to each axle suspending member whereby movement of said lever will move said tie rod and axle suspending member to raise and lower said axle and wheels attached thereto relative to said chassis.

4,089,543

BABY CARRIAGE

Arnie Osborne, 3810 Laurel Ave., Kansas City, Mo. 64133

Continuation-in-part of Ser. No. 637,631, Dec. 4, 1975, abandoned. This application Oct. 15, 1976, Ser. No. 732,945
Int. Cl.[2] B62B *11/00*
U.S. Cl. 280—647 7 Claims



1. A baby carriage comprising:

a substantially hollow main body having forwardly converging side walls with upper edges;

a plurality of wheels supporting said main body;

an upper body portion having forwardly converging side walls with lower edges corresponding to said converging side walls of said main body, said upper body portion further including a seat assembly;

linkage means coupling said upper body portion with said main body portion for pivotal movement relative thereto between an extended upper position wherein said upper body portion projects above said main body with said lower edges of the upper body portion adjacently overlying said upper edges of the main body and a retracted lower position wherein said upper body portion is disposed substantially within said main body, said linkage means including a pair of substantially parallel pivot arms each having a first end pivotally coupled with said main body and a second end pivotally coupled with said upper body portion, said first end of each arm being located below and to the rear of said second end thereof when said upper body portion is in the extended upper position; and

releasable means of retaining said upper body portion in the upper position.

4,089,544

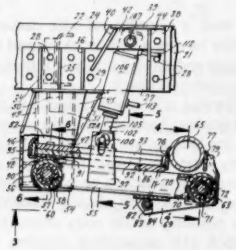
AXLE SUSPENSION

John E. Raidel, Rte. 9, Box 400-M, Springfield, Mo. 65804

Filed Aug. 31, 1976, Ser. No. 719,286

Int. Cl.[2] B60G *11/46*

U.S. Cl. 280—709 **15 Claims**



1. In a vehicle suspension: a torque arm for supporting a vehicle axle; means for mounting the torque arm upon a vehicle for movement in up and down directions relatively to the vehicle; a fluid motor for connection to the vehicle and to the torque arm, comprising a hydraulic cylinder and piston in the cylinder, a hydraulic pump, and fluid conduits from the pump to the opposite ends of the cylinder, and control means to enable liquid to act selectively on opposite sides of the piston, first substantially unyielding forcetransmitting connecting means including the fluid motor to transmit forces through the fluid motor unyieldingly between the vehicle and the torque arm in one direction, and second yielding force-transmitting connecting means including the fluid motor to transmit forces through the fluid motor yieldingly between the vehicle and the torque arm in the other direction.

4,089,545

VEHICLE SAFETY SEATING

Hugh J. Ferry, 12043 Arroyo Dr., Santa Ana, Calif. 92705

Filed Aug. 31, 1976, Ser. No. 719,172

Int. Cl.[2] B60R *21/04*

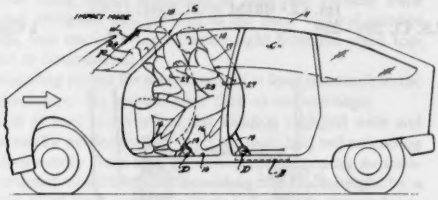
U.S. Cl. 280—751 **26 Claims**

1. A vehicle safety seating adapted to embrace a seated occupant during an accident sequence and including in combination:

a depressible cushion of energy absorbing material in complimentary opposition to the anterior form of the seated occupant;

a seat with a depressible cushion of energy absorbing material in complimentary supported engagement with the posterior form of the seated occupant;

means stopping the seat and comprised of spaced rear and forward stops, the rear stop stopping the seat in a normal operational mode free to move forwardly in the event of



severe deceleration, and the forward stop stopping the seat in a post impact mode in spaced relation to the first mentioned cushion with the occupant embraced between the first mentioned cushion and the seat cushion;

and means restraining rearward movement of the seat from said post impact mode in spaced relation to the first mentioned cushion with the occupant protectively compressed therebetween.

4,089,546

PRESSURE-SENSITIVE AND/OR HEAT-SENSITIVE RECORDING MATERIAL

Jean Claude Petitpierre, Kaiseraugst, Switzerland, assignor to CIBA-GEIGY Corporation, Ardsley, N.Y.

Filed Dec. 9, 1976, Ser. No. 748,869

Claims priority, application Switzerland, Dec. 17, 1975, 16339/75

Int. Cl.[2] B41M *5/16, 5/18, 5/22*

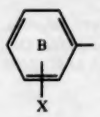
U.S. Cl. 282—27.5 **15 Claims**

1. A pressure-sensitive and/or heat-sensitive recording material which contains, as the colour former, at least one azine compound of the general formula

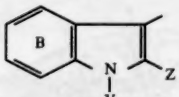
$$A - CH = N - N = CH - A \quad (1)$$

wherein A represents one of the following radicals

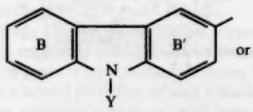
(1.1)



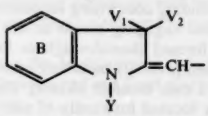
(1.2)



(1.3)



(1.4)



wherein

X represents the radical

—O—R_1 or —S—R_1,

R_1 represents alkyl which has at most 12 carbon atoms and is unsubstituted or substituted by halogen, hydroxyl, cyano, lower alkoxy, lower alkoxy-carbonyl, cycloalkyl, or phenyl or benzyl which are unsubstituted or substituted by halogen, nitro, lower alkyl or lower alkoxy,

R_2 represents hydrogen, alkyl which has at most 12 carbon atoms and is unsubstituted or substituted by halogen, hydroxyl, cyano, lower alkoxy, lower alkoxycarbonyl, cycloalkyl, or benzyl which is unsubstituted or substituted by halogen, nitro, lower alkyl or lower alkoxy, or

R_1 and R_2 together with the nitrogen atom which links them represent a 5-membered or 6-membered heterocyclic radical,

Y represents hydrogen, alkyl which has at most 12 carbon atoms and is unsubstituted or substituted by halogen, hydroxyl, cyano, lower alkoxy, lower alkoxy-carbonyl, or benzyl which is unsubstituted or substituted by halogen, nitro, lower alkyl or lower alkoxy, Z represents hydrogen, lower alkyl or phenyl and

V_1 and V_2 each represent lower alkyl, cycloalkyl or benzyl, or conjointly represent alkylene, and

the rings B and B' independently of one another are unsubstituted or substituted by halogen, nitro, cyano, trifluoromethyl, lower alkyl, lower alkoxy, lower alkoxy-carbonyl, phenoxy, amino, lower alkylamino or N-lower alkylcarbonylamino.

4,089,547

MANIFOLD RECEPTOR SHEETS AND PROCESSES THEREFOR

Carl Brynko, Oakland, and Stephen P. Grzech, Butler, both of N.J., assignors to Reprographic Materials, Inc., Pompton Lakes, N.J.

Filed Jul. 21, 1976, Ser. No. 707,234
Int. Cl.[2] B41L *1/36;* B41M *5/16*
U.S. Cl. 282—27.5 **9 Claims**

8. A manifold set for replicating written symbols which set comprises a substrate coated on at least a portion of one surface with fumed silicon dioxide particles having an acid pH and a diameter ranging from 7 to 14 nanometers and a surface area of from about 200 m^2/g to 400 m^2/g and capable of reacting with a chromogenic material to produce a colored visible image and an adhesive for maintaining the particles on the surface of the substrate, and in contact with the coating a layer of pressure rupturable capsules containing a leuco dye-forming material, the silicon dioxide particles comprising from 50 to 95 percent by weight of the coating.

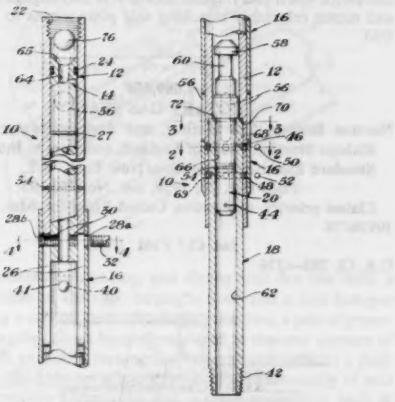
4,089,548

HYDRAULIC RELEASING TOOL WITH PLUG

Derrel G. Gurley, Houston, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 12, 1976, Ser. No. 731,599
Int. Cl.[2] E21B *23/00;* F16L *37/22*
U.S. Cl. 285—3 **9 Claims**

1. An elongated tool for detachably connecting a sand screen and liner assembly to a tubing string, comprising a releasing housing sleeve having an upper and lower end, a hollow hookup nipple which partly telescopes within the lower end of the releasing housing sleeve, a movable hollow piston having a ball valve seat at one end and a cross bore extending through its other end part, said piston fitting within the upper end part of said releasing housing sleeve with the cross bore aligned with an array of longitudinally extending slots which are disposed in and extend through the releasing housing sleeve, said hookup nipple having circumferentially extending grooves near its upper end which each mate with an array of bores extending through the releasing housing sleeve near the lower end of said sleeve, a plurality of detent elements disposed in said array of bores and in said grooves, and a retainer sleeve, said retainer sleeve fitting over said releasing housing sleeve and being coupled to the cross bore of said piston through said array of slots to cover the arrays of bores



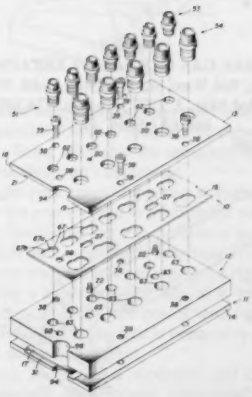
in the releasing housing sleeve, said retainer sleeve containing near its lower end part above the part which covers said arrays of bores an array of elongated slots which are axially aligned with said arrays of bores in said releasing housing sleeve whereby downward movement of said piston forces said retainer sleeve downward, so said array of elongated slots in said retainer sleeve uncover said arrays of bores, permitting said detent elements to fall out and release said hookup nipple from said releasing housing sleeve.

4,089,549

SIMULTANEOUS PLURAL FLUID CONDUCTOR CONNECTIONS

Gerrard N. Vyse, Bedford, and Horise M. Cooke, Weatherford, both of Tex., assignors to Stratoflex, Inc., Fort Worth, Tex.

Filed Oct. 21, 1976, Ser. No. 734,462
Int. Cl.[2] F16L *47/00*
U.S. Cl. 285—137 R **19 Claims**



1. Apparatus for use with a manifold and a plurality of hose fittings, comprising plate means, retainer means positioned

closely adjacent to said plate means, fastener means movably attaching said plate means and said retainer means for movement of said retainer means relative to said plate means between an engaged position and a disengaged position, said plate means and said retainer means having openings therein which receive said plurality of fittings when said retainer means is in said disengaged position, said plate means and said retainer means including means releasably engaging said plurality of fittings and holding said fittings in assembled relation therewith when said retainer means is in said engaged position, and means releasably attaching said plate means to the manifold.

4,089,550

ROTARY GAS SEAL

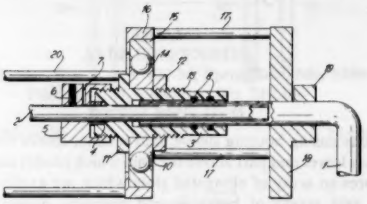
Norman Denton, Old Harlow, and Andrew Baxter Harding, Bishops Stortford, both of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,353

Claims priority, application United Kingdom, Mar. 18, 1976, 10926/76

Int. Cl.[2] F16L *17/02*

U.S. Cl. 285—276 **8 Claims**



1. A rotary gas seal for providing a gas-tight connection between first and second pipes having a common axis wherein one pipe is capable of rotation with respect to the other about their common axis, comprising:

a tubular seal member having an end wall with an aperture therein, said first and second pipes extending into said tubular seal member from opposite directions;

a rotary bearing having first and second annular portions, said first annular portion rigidly coupled to said second pipe for securing said second pipe, and said second annular portion rigidly coupled to said tubular seal member to provide rotation to said tubular seal member;

a rigid gas-tight seal in said aperture for securing said first pipe; to said tubular seal member and

a gas-tight gland coupled between said tubular sealing member and said second pipe.

4,089,551

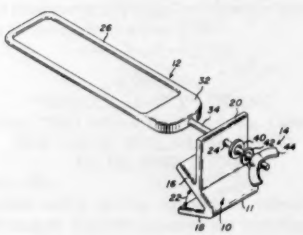
QUICK-RELEASE GAS CAP LATCH RETAINER DEVICE

Walter Perreira, 966 West St., Hollister, Calif. 95023

Filed Mar. 3, 1977, Ser. No. 774,129

Int. Cl.[2] E05C *19/18*

U.S. Cl. 292—260 **4 Claims**



1. A latch retainer device for securing a quick release gas cap means in its closed and locked position, such cap means being of the type including a cap which is rotatably attached to a tank filler neck by a hinge member and is releasably held in its closed position by a release handle that is pivotally attached to the filler neck and extends upwardly to engage a mating tang extending from the gas cap, said device comprising:

A clip means including

a first generally flat section,

a second generally flat section joined at one end at a first acute angle to an end of said first section to form a recessed portion, and

a third generally flat section forming an upstanding portion, said third section being joined at one end to a midportion of said first section such that said recessed portion is adapted to matingly engage the cap hinge member; and

an elongated latching body having one end adapted to engage the release handle and take-up means affixed to the opposite end for drawingly engaging said upstanding portion to prevent the release handle from rotating into its unlocked position.

4,089,552

CONTACT LENS LOCATION FINDER

William A. Hermanson, 3700 Galt Ocean Dr., Ft. Lauderdale, Fla. 33308

Filed Apr. 11, 1977, Ser. No. 786,577

Int. Cl.[2] A61F *9/00*

U.S. Cl. 294—1 CA **6 Claims**

1. A device for assisting a person with impaired vision to manually locate and grasp a bowl-shaped hard contact lens for the person's eye, said device being a flat, one-piece pad of aerated polyethylene having a narrow bridge segment and enlarged segments at the opposite ends of the bridge segment, said pad having smooth opposite major faces which are heat sealed and water repellent, said pad being of substantially uniform thickness between its opposite major faces, said bridge segment having a width substantially equal to the outside diameter of the lens and having a length between said enlarged end segments which is substantially greater than the outside diameter of the lens, whereby the lens with its convex surface resting on said bridge segment is readily locatable by the person's thumb and forefinger or middle finger of one hand guided by the opposite longitudinal edges of the bridge segment while the person's other hand engages one of said enlarged ends, said pad being easily flexible manually at said bridge segment to be folded transversely midway along the bridge segment for storage in a container with said enlarged end segments in face-to-face confronting relationship to one another, said pad being sufficiently resilient to spring back to its flat shape when removed from the container.

4,089,553

DEVICE FOR HANDLING POLE VAULT CROSSBARS

Paul R. Frykholm, 640 E. Lincoln, Libertyville, Ill. 60048

Filed Apr. 21, 1977, Ser. No. 789,350

Int. Cl.[2] B25J *1/00*

U.S. Cl. 294—19 R **10 Claims**

1. A device adapted for handling and manipulating a pole

vault crossbar into position on supporting pins at a selected elevation on spaced upright pole vault standards, and comprising:

a head having a generally horizontal elongate cradling trough having rear and front sides and adapted to receive a crossbar cradled therein;

said trough being defined by a base portion, upstanding rear flange means and unobstructed upstanding scooping and crossbar retaining front flange means;

elongate handle means connected to said head and extending downwardly generally normal to said trough for manipulating the device, and with the forward perimeter area of the handle means near a plane along and projected down from said front flange;

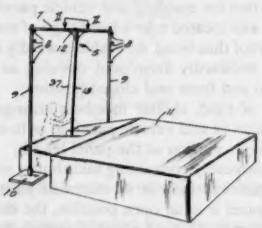
a supporting structure on said head extending rearwardly relative to said rear flange means of the trough;

an elongate clamping member;

means spaced from said rear flange means and mounting the clamping member movably on said supporting structure;

said clamping member having a substantially straight clamping finger portion extending from said mounting means above said rear flange means into overlying clamping relation to the trough;

means acting between said supporting structure and said clamping member for normally biasing said clamping member toward said trough to urge said clamping finger portion down into clamping retaining engagement relation with respect to a crossbar in the trough with sufficient clamping force to permit the crossbar to be handled by



manipulation of the device from a generally ground level position into supported position on pins at a selected elevation on the standards;

clamp retracting means connected to said clamping member and adapted for moving the clamping member in opposition to said biasing means to retract the clamping finger portion from said clamping relation as an initial maneuver to clear the trough for receiving the crossbar therein as by scooping the crossbar into the trough from a generally ground level surface by means of said front flange means;

said clamp retracting means being releasable to release the clamping member for biased clamping retaining engagement of said clamping finger portion with the crossbar received in said trough; and

said clamp retracting means being operable after the crossbar has been raised up to and placed on the selected supporting pins on the standards to retract said clamping member against the force of said biasing means and thereby release and clear said clamping finger portion from its biased clamping retaining engagement with the crossbar and into substantial clearance relation to said front flange means whereby to permit free removal of the device from the crossbar to leave the crossbar in position on the selected supporting pins on the standards;

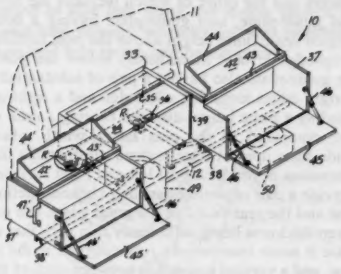
the device being adapted when not in use to be laid upon a floor or like surface with said front flange means and said handle means supporting the device substantially flat face down on such surface with said supporting structure and said clamping member then extending upwardly away from said surface.

4,089,554

CAMPER COOKING AND DINING UNIT

Donald R. Myers, 6757 Judistine Dr., Fair Oaks, Calif. 95628

Filed Oct. 4, 1976, Ser. No. 729,466
Int. Cl.² B60R *7/08*
U.S. Cl. 296—24 A **5 Claims**



1. A collapsable cooking and dining unit for use with a motor vehicle of the type having a floor and a rear bumper comprising a central generally rectangular box, a pair of generally rectangular boxes hingedly secured to the rear corners of said central generally rectangular box and moveable to a position extending substantially perpendicularly outwardly of said central generally rectangular box, a track underlying each of said pair of boxes and means detachably secured to the bumper of the vehicle engaging in said track for supporting said boxes in their extended position comprising bearing means disposed on a shaft which rides in said track, and an arm connecting said shaft to said rear bumper by bracket means.

4,089,555

WALL STAKE FOR VEHICLE SIDEWALL PANELING

John D. Allen, 5001 "A" St. (Apt. #6), Omaha, Nebr. 68106

Filed Dec. 20, 1976, Ser. No. 752,102
Int. Cl.² B62D *25/02*
U.S. Cl. 296—28 M **9 Claims**

1. A wall stake adaptable for removable insertion into a flat bed vehicle provided with a plurality of depending pockets, said wall stake being adaptable for uprightly supporting vehicle sidewall paneling and comprising:

A. an upright post extending along a vertical-axis from a header at the post top-end to a foot at the post bottom-end, said post having an upright periphery surrounding said vertical-axis and including a uniplanar front-surface of a finite lateral-width, a left-surface, and a right-surface, said post having a cross-sectional size of at least about three square inches whereby said post is semi-rigid in the transverse direction when its foot is removably implanted into a vehicle depending pocket;

B. a plurality of vertically separated and distinct tubular bushing spacers each located substantially halfway between the post left and right surfaces and extending a given transverse-length forwardly perpendicularly from the post front-surface; and

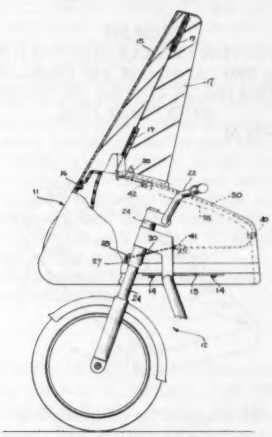
C. an upright structurally resilient guide-plate abutting the said spacers and being attached to the post with a plurality of distinct fasteners each extending transversely through the post, the tubular bushing spacer, and the guide-plate, said guide-plate having a finite given-thickness defined by a pair of transversely separated broad faces, one of which includes the rear-face of said guide-plate located at the spacers and the other of which includes the front-face of said guide-plate, said guide-plate having a bottom-edge located some finite height above the post bottom-end and a top-edge located immediately below the post top-end, the guide-plate also having a pair of substantially parallel upright edges including a leftedge and a right-edge separated by a finite lateral-distance bearing a ratio of at least two compared to the post lateral-width whereby said guide-plate upright edges extend substantially like lateral-extensions beyond the post left and right surfaces so as to provide a pair of similar paneling channels defined by the post and the rear-faced of the guide-plate, the guide-plate given-thickness being sufficiently thin such that the guide-plate is more transversely resilient than is the implanted post, and a vertical separation between each of the respective distinct spacers being sufficiently great such that the entire guide-plate between said spacers is transversely resiliently defelectable over the entire lateral-distance thereof.

4,089,556

MOTORCYCLE FAIRING-WINDSHIELD ASSEMBLY

Leonard T. Stobar, Los Angeles, Calif., assignor to Kimstock, Inc., Santa Ana, Calif.

Filed Nov. 26, 1976, Ser. No. 745,446
Int. Cl.[2] B62J *17/04*
U.S. Cl. 296—78.1 **8 Claims**



1. A fairing-windshield assembly for use on a motorcycle or the like, comprising:

a windshield central portion,

a windshield side portion pivotally attached to each of the opposite side edges of said central portion to form articulated side wing units,

a fairing adapted to be fixedly attached to a motorcycle, said windshield central portion being mounted on said fairing, and

means for connecting said windshield side portions to the steering mechanism of said motorcycle, said connecting means including for each windshield side portion a cable connected to the steering mechanism of the motorcycle and coupler means for coupling the cable to the windshield side portion, whereby when said steering mechanism is turned in one direction, one of said windshield side portions is drawn outwardly to avoid interference with said steering mechanism, and when the steering mechanism is turned in a direction opposite to said one direction, the other of said windshield side portions is drawn outwardly to avoid interference with said steering mechanism.

4,089,557

UPWARDLY PIVOTABLE VENT OR SLIDING ROOF PANEL FOR AUTOMOBILES

Robert Leiter, Krailling, Germany, assignor to Webasto-Werk W. Baier KG, Germany

Continuation of Ser. No. 460,110, Apr. 11, 1974, abandoned.
This application Mar. 9, 1976, Ser. No. 665,286
Claims priority, application Germany, Apr. 14, 1973, 2319063
Int. Cl.[2] B60J *7/04*
U.S. Cl. 296—137 F **10 Claims**

8. Moveable vehicle panel apparatus including a vehicle panel which is moveable to and from a closed position closing an opening in a vehicle body portion defining a passenger space, comprising:

pivot means between said vehicle panel and said vehicle body portion for enabling said vehicle panel to be pivoted about an axis located near a front edge of said panel, a rear edge thereof thus being moveable inwardly into said opening and outwardly from said opening as said panel is moved to and from said closed position;

a plurality of rigid, shutter members arranged adjacent to lateral edges of said vehicle panel, so as to extend along at least a major portion of the panel length;

means for moveably connecting said shutter members to said vehicle panel so that, in an extended position, when the vehicle panel is in an open position, the shutter members extend from said lateral edges, thereby substantially covering gaps formed between said lateral edges of said vehicle panel and lateral edges of said opening;

said connecting means including a pivotal connection between said shutter members and said vehicle panel, each pivotal connection defining a pivot axis located near the forward extremity of the shutter members, the latter being thereby pivotable relative to said vehicle panel; and

resilient means for biasing the shutter members in a spring-like manner toward said extended position against stop means thereby precluding rattling.

4,089,558

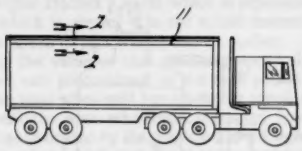
ROOF SYSTEM FOR VANS

Tara N. Banerjea, Warren, and Donald B. Stinson, Jr., Farmington, both of Mich., assignors to Fruehauf Corporation, Detroit, Mich.

Filed Jul. 11, 1977, Ser. No. 814,411
Int. Cl. B62d *31/02*
U.S. Cl. 296—137 R **7 Claims**

1. A roof and sidewall system for an over-the-road trailer or van comprising a pair of side walls having a plurality of vertical side wall posts, a pair of longitudinally extending top rails on said side walls having downwardly extending flanges overlying the upper ends of said posts and secured thereto, said top rails having lower horizontally extending flanges and upper horizontally extending flanges in vertically spaced relation above said lower flanges, a plurality of sheet metal roof bows extending laterally between said top rails and secured to the lower flanges thereof, a roof skin extending across the top of said roof bows and secured to the upper flanges of said top

rails, the end portions of said roof bows being flattened downwardly to provide an air gap between the point of attachment thereof to the lower flanges of said top rails and the point of



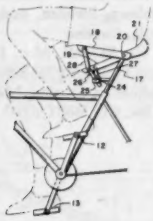
attachment of said roof skin to the upper flange of said top rail thereby to minimize the transfer of flutter of said roof skin to said vertical posts.

4,089,559

VEHICLE SEAT

Bernard H. Prange, 1006 Easy St., and Gerald P. Fignar, 8 Red Fox La., both of Burkburnett, Tex. 76354

Filed Sep. 13, 1976, Ser. No. 722,666
Int. Cl.[2] B62J *1/00*
U.S. Cl. 297—201 **5 Claims**



1. A vehicle seat for a vehicle propelled by leg action of the rider comprising:

(a) a seat post means adapted to be rigidly affixed to said vehicle;

(b) a right and a left body support means adapted to support the rider in a sitting position, each said body support means being pivotally affixed to said seat post means whereby the front portions of said right and left body support means can move upwardly and downwardly; and

(c) a coupling means engaging said right and left body support means and adapted to move the front portions of said right and left body support means upwardly and downwardly simultaneously in opposite directions relative to each other, said coupling means comprising a shaft rotatably supported by said post means with right and left crank levers rigidly affixed to the opposite ends of said shaft and right and left connecting rods operably connecting said right and left body support means to said right and left crank levers whereby pivotal rotation of said body support means causes movement of said crank levers.

4,089,560

SEAT DEVICE

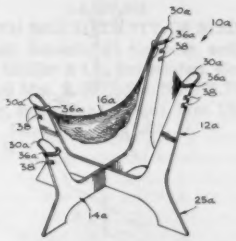
Jorge Jose de Mattos, Encino, Calif., assignor to John J. Posta, Jr., Encino, Calif., a part interest

Continuation-in-part of Ser. No. 761,316, Jan. 21, 1977. This application Jul. 18, 1977, Ser. No. 816,399
Int. Cl.[2] A47C *4/02*
U.S. Cl. 297—441 **10 Claims**

1. An improved readily assembled adjustable seat device, said device comprising, in combination:

a. a seat support comprising a plurality of generally U-shaped intersecting support members, each said support member comprising a crosspiece interconnecting a pair of spaced generally parallel legs, each said crosspiece including a notched portion, said crosspieces being loosely releasably interconnected at said notched portions to permit limited adjustment of spacing and angle between said legs, said legs collectively defining at one common end thereof a base support for said device;

b. a flexible seat member of extended surface area releasably connected to said legs along the length thereof remote from said base support, whereby said seat member hangs between said legs above said base support;



c. said seat member having a flexible rear portion extending between the rear parallel legs which imparts an attractive force to such legs when a body rests on said seat members;

d. said seat member further having a flexible forward portion extending between the forward parallel legs which imparts an attractive force to such legs when a body rests on said seat member; and,

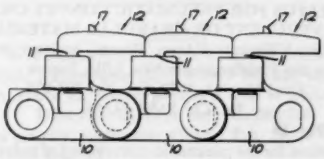
e. whereby the attractive forces tend to generate a locking force at the point of intersection of said crosspieces to provide a rigid base support.

4,089,561

CUTTER CHAINS HAVING PICKS AND TO PICKS THEREFOR

John Carden, Nassau, Bahamas, assignor to Gimda, Inc., Nassau, Bahamas

Filed Oct. 5, 1976, Ser. No. 729,866
Int. Cl.[2] E21C *25/42*
U.S. Cl. 299—83 **6 Claims**



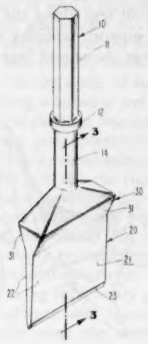
1. In an endless cutter chain having picks mounted on pick boxes, each pick comprising a body portion with an integral shank having at least one cutting edge protruding from said body portion, the improvement wherein the picks are constructed to have abutments on said body portions such that angular movement of a pick and pick box in the plane of movement of the chain is limited by an abutment surface on the pick abutting against an abutment surface on the next adjacent pick in the chain.

4,089,562

CUTTER FOR ASPHALT PAVING

Frederick F. Baumeister, 11 Sterner Ave., Broomall, Pa. 19008

Filed Apr. 27, 1977, Ser. No. 791,543
Int. Cl.[2] E21C *37/26*; E01C *23/09*
U.S. Cl. 299—94 **4 Claims**



1. A cutter tool for asphalt paving and the like, said tool comprising:

a. an upper shank adapted to be received within the socket of a power-driven hammer mechanism;

b. a lower blade characterized by a cutting edge at its lower end, said lower blade further comprising a first pair of substantially flat opposing upwardly divergent sidewalls inclined at an angle less that 10° relative to the vertical; and

c. a means for facilitating the removal of said tool from said asphalt, said removal comprising a wedging-and-reaction portion located intermediate said blade and said shank, said wedging-and-reaction portion characterized by a second pair of substantially flat upwardly divergent sidewalls inclined at an angle in the range of 15°–35° relative to the vertical, wherein the surfaces of said first pair of sidewalls intersect respectively with the surfaces of said second pair of sidewalls along discrete lines, and wherein said second pair of sidewalls wedges said cut asphalt apart and develops a reaction force in a blade-lifting direction in response to downward force applied to said blade when said blade is driven in a downward direction beyond the upper limit of said blade.

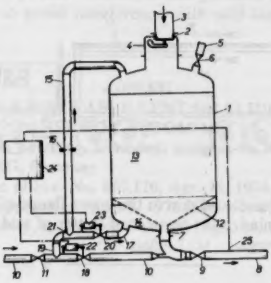
4,089,563

APPARATUS FOR PNEUMATIC CONVEYANCE OF PULVERULENT OR GRANULAR MATERIALS

Francis Neu, Villeneuve-d'Ascq, France, assignor to Societe Anonyme des Etablissements Neu, Lille, France

Filed May 11, 1977, Ser. No. 795,771
Int. Cl.[2] B65B *53/66*
U.S. Cl. 302—35 **7 Claims**

7. A method for the pneumatic conveyance of pulverulent or granular material wherein said material to be conveyed is fluidised in a reservoir by means of a stream of gas which is introduced into the reservoir via a fluidisation barrier, and said fluidised material is conveyed from said reservoir through a conveyor conduit with the aid of a stream of gas injected into said conduit, and wherein the rates of supply of said gas streams for fluidisation and for conveyance are controlled in dependence on the pressure in the conduit by increasing the rate of supply of gas for fluidisation when said pressure falls below a first predetermined value and decreasing the rate of supply of gas for fluidisation or stopping it altogether when said pressure rises above a second predetermined value, and



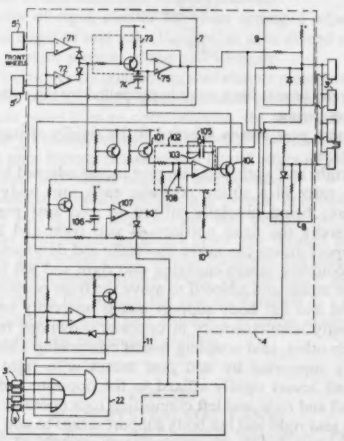
when the supply of gas for fluidisation is stopped, increasing the rate of supply of gas for conveyance.

4,089,564

METHOD AND APPARATUS FOR PREDICTING VEHICLE SPEED IN BRAKING CONTROL SYSTEMS FOR WHEELED VEHICLES

Ulf Erik Öberg, Goteborg, Sweden, assignor to Saab-Scania Aktiebolag, Sodertalje, Sweden

Continuation of Ser. No. 557,904, Mar. 13, 1975, abandoned.
This application Oct. 6, 1976, Ser. No. 730,293
Claims priority, application Sweden, Mar. 18, 1974, 7403585
Int. Cl.[2] B60T *8/10*
U.S. Cl. 303—109 **13 Claims**



1. A method for generating a predicted speed signal representative of a predicted vehicle speed during braking for use in an anti-skid braking system, said method comprising the steps of:

generating a predicted speed signal representative of the actual speed of a vehicle prior to the initiation of a braking operation;

decreasing the value of said predicted speed signal at a first preselected empirical rate upon the initiation of a braking operation;

performing an updating step including comparing said predicted speed signal to an actual speed signal representative of the actual instantaneous peripheral speed of a wheel of said vehicle and generating an updating signal each time said actual speed signal indicates that the actual instanta-

neous peripheral speed of said wheel is greater than the predicted speed as determined by said predicted speed signal;

increasing the value of said predicted speed signal each time a new up-dating signal is generated until said predicted speed signal reaches a value which is representative of a speed which is greater than the actual instantaneous peripheral speed of said wheel; and thereafter

decreasing the value of said predicted speed signal at an up-dated rate proportional to the time period extending from the time when said last up-dating signal was generated until the time when said predicted speed of said vehicle as indicated by the predicted speed signal last rose above a value which was equal to the instantaneous peripheral speed of said wheel; and

continuously increasing the rate at which said predicted speed signal is decreased during the time between successive updating steps.

4,089,565

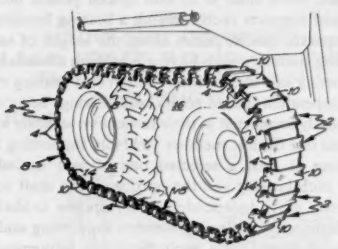
REMOVABLE TRACK STRUCTURE FOR WHEELED VEHICLES

George A. Loegering, 331 13th Ave. N., Casselton, N. Dak. 58012, and Louis J. Keller, Cogswell, N. Dak. 58017

Filed Nov. 3, 1975, Ser. No. 628,525

Int. Cl.[2] B62D *55/20*

U.S. Cl. 305—45 **10 Claims**



1. A track belt for wraparound, removable mounting around the outer periphery of the tires of a wheeled vehicle comprising:

a plurality of track sections pivotally linked together to permit the track belt to assume a cuved configuration conforming to the arcuate shape of a tire,

each of said track sections comprising a ground engaging crossbar member interconnecting a pair of opposed walls angularly disposed with respect to said crossbar member at opposite ends thereof, said opposed walls being spaced apart a predetermined distance to form a seating area for the sidewalls of a tire therebetween; and

link means extending between said opposed walls of each track section and the adjacent track sections on each side thereof along the length of said track belt comprising a first link member rigidly and integrally joined at one end thereof to a segment of one of said opposed walls of a first track section and extending longitudinally of said track belt from one side of said first track section to a pivot pin connection with a second, adjacent track section, each of said first link members having at least one pivot pin receiving aperture in the free end thereof, for said pivot pin connection, and a second link member pivotally attached to said first track section by a pivot pin extending generally transversely of said track belt through an aperture in the free end of said second link member and through an apertured coupling portion on said one wall of said first track section on the opposite side of said first track section from said first link member, said second link member extending longitudinally of said track belt to a rigid integral connection with one of a pair of opposed walls of a third, adjacent track section on said opposite side of said first track section, whereby each connecting link is rigidly joined at one end to one track section and is pivotally attached to an adjacent track section to thereby provide only one pivotal link connection to each track section; and said second link member is laterally offset in a direction transversely of said track belt from said track section wall segment to which it is rigidly attached and positioned with its apertured end within the space defined between the wall segment to which the first link member is attached and another segment of said one wall to form said coupling portion.

4,089,566

BEARING WITH MULTIPLICITY OF SLIDING HEADS

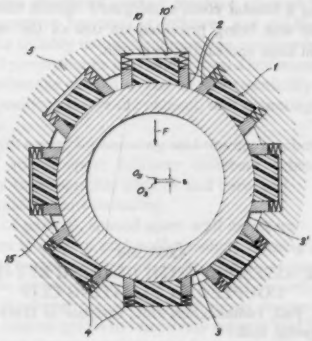
Wolfgang Schmidt, Schweinfurt, Germany, assignor to Kugelfischer Georg Schäfer & Co., Schweinfurt, Germany

Filed Mar. 9, 1977, Ser. No. 775,755

Claims priority, application Germany, Mar. 10, 1976, 2609935

Int. Cl.[2] F16C *27/02, 33/74*

U.S. Cl. 308—3 R **10 Claims**



1. A bearing comprising:

a first and a second support member mounted for relative rotation about an axis and separated by a gap centered on said axis;

a multiplicity of sliding heads carried on said first support member and extending across said gap to a confronting surface of said second support member in low-friction contact therewith, said sliding heads consisting essentially of elastically deformable material at least in the vicinity of said confronting surface;

a multiplicity of rigid retaining sleeves respectively embracing said sliding heads, said sleeves being positively guided on said first support member for displacement perpendicular to said confronting surface; and

spring means on said first support member urging said sleeves into engagement with said confronting surface.

4,089,567

WITHDRAWAL GUIDE FOR DRAWERS

Erich Röck, Kuferstrasse 1085, A-6973 Hochst, and Bernhard Mages, Harte 10, A-6850 Dornbirn, both of Austria

Filed Feb. 23, 1976, Ser. No. 660,316

Claims priority, application Austria, Feb. 25, 1975, 1447/75; Jun. 6, 1975, 4340/75

Int. Cl.[2] F16C *29/02*

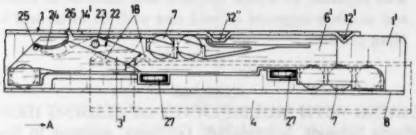
U.S. Cl. 308—3.6 **7 Claims**

1. A withdrawal guide for drawers, the drawer having two external sides, for use in a fixed structure having two internal sides comprising:

two support rails placeable on each of the fixed structure sides, respectively;

two guide rails disposed on the external sides of the drawer, respectively;

two mobile units, normally disposed in said support rails, respectively, each of said mobile units including at least two rollers, each of said rollers being supported between a corresponding one of said guide and support rails for taking up vertical forces, each of said support rails having a track, each of said tracks being formed with a cut-out, each of said mobile units being formed with at least one



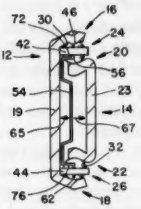
controllable stop, said stop being engageable with the cut-out in the track, upon the drawer being pulled out from said fixed structure for preventing said mobile unit to move in an inward direction, each of said support rails having a frontal zone, a safeguard against tilting of said mobile unit being provided on one of the support rail frontal zone and said mobile unit.

4,089,568

SLIDE ASSEMBLY WITH BEARING RETAINERS COUPLED BY FLOATING CLIP

Martin K. Fall, Indianapolis, Ind., assignor to Herbert S. Fall, Indianapolis, Ind.

Filed Apr. 18, 1977, Ser. No. 788,677
Int. Cl.[2] F16C *21/00, 29/04*
U.S. Cl. 308—3.8 **14 Claims**



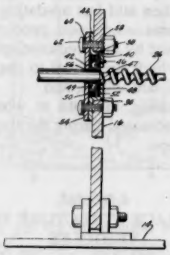
1. A slide comprising a first elongated track member formed to provide a downwadly facing longitudinal raceway and an upwardly facing longitudinal raceway, a second elongated track member formed to provide an upwardly facing longitudinal raceway in mating registry with the first said downwardly facing raceway and a downwardly facing longitudinal raceway in mating registry with the first said upwardly facing raceway, bearings disposed in said mating raceways to support said track members for relative longitudinal movement, bearing retainer means for maintaining the longitudinal spacing between said bearings in said raceways, said retainer means being longitudinally movable relative to said track members, said retainer means including a longitudinally extending rigid retainer bar between each set of mating raceway, and means for connecting said bars for movement together, said connecting means including a clip extending between and loosely connected to said bars to move transversely a limited amount relative to said track members.

4,089,569

RESILIENT MOUNT FOR THE DRIVING SHAFT OF AN IMPACT MATRIX PRINTER AND THE LIKE

William D. Rempel, Howell, Mich., assignor to Sycor, Inc., Ann Arbor, Mich.

Filed Feb. 19, 1976, Ser. No. 659,242
Int. Cl.[2] F16C *1/00, 27/06*
U.S. Cl. 308—184 R **15 Claims**



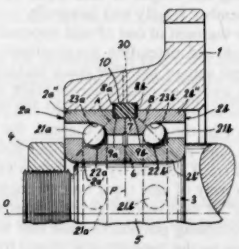
6. A yieldable, flexible suspension for a rotary driving shaft, comprising: an elongated rotary drive shaft freely and openly extending between a pair of separate and mutually independent spaced points along its length; means for independently supporting said drive shaft at its said spaced points, including a pair of fixed supports each carrying a bearing housing at said pair of separate spaced points along the length of said shaft, said bearing housings each having a bearing chamber; a bearing supporting said shaft within each of said bearing chambers at said independent spaced points, said bearings being mutually independently supported at their respective separate locations; and at least one flexible member yieldably supporting the shaft and bearing at least a selected one of said spaced points, whereby such bearing and the portion of the shaft supported thereby may move independently in response to shaft distortion by flexure of said flexible member supporting said bearing and without transmitting such distortion movement to the other bearing or other support portion of the shaft through structure extraneous to the shaft.

4,089,570

JOURNAL BEARING WITH AXIALLY SPLIT BEARING RINGS

Günter Markfelder; Heinrich Hofmann, both of Schweinfurt, and Günter Scharting, Gochsheim, all of Germany, assignors to Kugelfischer Georg Schafer & Co., Schweinfurt, Germany

Filed Jan. 26, 1977, Ser. No. 762,563
Claims priority, application Germany, Jan. 31, 1976, 2603685
Int. Cl.[2] F16C *23/06, 33/60*
U.S. Cl. 308—194 **11 Claims**



1. A journal bearing for rotatably supporting a shaft in a housing with absorption of both radial and axial stresses therebetween, said housing having a unitary wall with an inner

peripheral surface coaxially surrounding said shaft, comprising:

a geometrically continuous inner bearing ring on the peripheral surface of said shaft;

a geometrically continuous outer bearing ring tightly fitted into the peripheral surface of said wall;

two axially spaced sets of rotary bodies seated between said bearing rings, said bodies engaging said inner and outer bearing rings along respective contact zones axially offset from each other whereby said sets have seat axes converging toward one of said peripheral surfaces, said one of said peripheral surfaces being provided between said sets with an annular rib received in an annular peripheral recess on an adjoining surface of one of said bearing rings for resisting axial displacement of said one of said bearing rings with reference to said one of said peripheral surfaces, said one of said bearing rings being split into a pair of axially abutting halves, said recess being constituted by an annular rabbet on at least one of said halves terminating at a radial face which confronts an adjoining radial face of the other of said halves; and

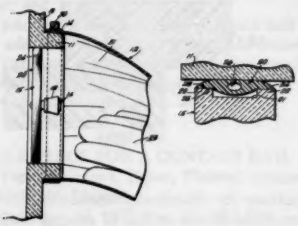
a pair of abutments on the other of said peripheral surfaces holding the other of said bearing rings in axially fixed position therebetween.

4,089,571

GLOVE PORT AND INSERT

Jerome J. Landy, 13700 SW. 78 Ct., Miami, Fla. 33158

Filed Apr. 8, 1976, Ser. No. 675,256
Int. Cl.[2] A61G *11/00*
U.S. Cl. 312—1 **4 Claims**



1. A glove port and insert for a closed chamber having side walls comprising, in combination,

a closed chamber,

glove port openings in said closed chamber side walls,

a collar on a wall of said chamber surrounding a glove port opening having an outer and inner surface,

a glove having a sleeve portion positionable on said collar on its outer surface,

clamping means for securing said sleeve portion of said glove to said collar outer surface,

an insert having a periphery complementary with the interior surface of said collar,

handle hold means for gripping said insert while the operator's hand is in said glove,

an undercut defining flanking rings around the periphery of the insert,

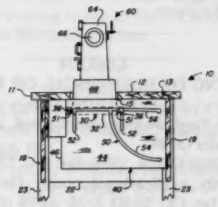
a crescent shaped gasket secured to said flanking rings which is compressible into the groove defined by the flanking rings to which the gasket is secured, whereby the insert may be positioned by the operator wearing the glove into the port and sealingly secured to the same by the compressive action of the interior portion of the collar against the gasket when the same is compressed by its engagement with the interior of the collar.

4,089,572

MULTIPLE POSITION SEWING MACHINE CABINET

Larry Charles Flynt, 4858 Kernersville Rd., and Robert Clinton Flynt, Jr., 4864 Kernersville Rd., both of Kernersville, N.C. 27284

Filed Jan. 24, 1977, Ser. No. 761,684
Int. Cl.[2] A47B *81/00*
U.S. Cl. 312—27 **3 Claims**



1. In combination with a multiple position sewing machine cabinet and a drophead sewing machine adapted for use in multiple operative positions, a follower and guide mounting assembly for slidably mounting the sewing machine head to the cabinet and permitting its movement from a horizontal, storage position within the cabinet to one or more vertically-elevated, operative positions above the cabinet, said mounting assembly comprising:

a base with means for securing said sewing machine thereto;

pairs of spaced-apart follower members extending outwardly from opposite ends of said base; and

spaced guide means including:

a pair of parallel, spaced-apart wall members;

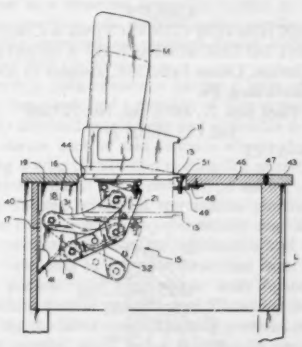
grooves in each of said wall members forming a substantially horizontal, spaced guide with an arcuate, spaced guide interconnecting therewith and extending downwardly therefrom; and support means cooperating with said spaced guides to selectively support said base member in a storage position and in one or more vertically-elevated operative positions.

4,089,573

HINGE ASSEMBLY FOR MOUNTING SEWING MACHINE IN CABINET

Eugene Aeschliman, Jackson, Miss., assignor to DeSoto, Inc., Des Plaines, Ill.

Filed Feb. 7, 1977, Ser. No. 765,993
Int. Cl.[2] A47B *81/00*
U.S. Cl. 312—27 **4 Claims**



1. In combination, a hinge assembly for mounting a sewing machine on a cabinet, comprising a first pair of spaced brackets secured to said cabinet, a second pair of spaced brackets, upper and lower pairs of spaced links pivotally secured to said first and second pairs of brackets to afford a parallelogram-like

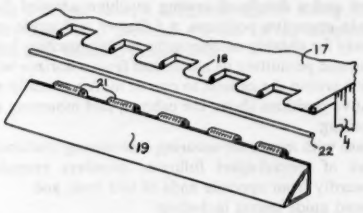
linkage arrangement, a support member pivotally secured at one end proximate to the upper end of each of one of said second pair of spaced brackets and providing generally horizontal support surfaces on which the machine is rested, means for securing a sewing machine on said support surfaces, and means for adjusting the angular relation of each of said support members relative to a respective one of said second pair of brackets to adjust the horizontal position of said machine relative to said cabinet.

4,089,574

PACKAGING OF ELECTRICAL OR ELECTRONIC COMPONENTS

Neville George Ford, 64 Darbyshire Road, Mt. Waverley, Victoria, Australia (3149)

Filed Oct. 6, 1976, Ser. No. 729,953
Claims priority, application Australia, Oct. 8, 1975, 3486/75
Int. Cl.[2] B65D 7/28; A47B 87/00
U.S. Cl. 312—108 8 Claims



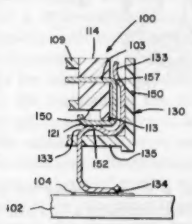
1. In a housing for packaging electrical or electronic components having a generally horizontal planar sheet of predetermined thickness unsupported along an edge and tending to bow along said edge under the weight of the sheet or component loads: a means for stiffening said edge comprising a stiffening member hingedly attached along the entirety of said edge for being swung between first and second positions in which it, respectively, does not project beyond the plane of one surface and the opposite surface of said sheet; said member having portions thereof displaced from said hinge along the edge radially of the axis of hinging; said member being formed of a structural material and having a cross-sectional configuration in a plane normal to said edge and the axis of hinging enabling the stiffness member to stiffen said edge in all hinged orientations of said stiffener member.

4,089,575

CONNECTOR FOR CONNECTING A CIRCUIT ELEMENT TO THE SURFACE OF A SUBSTRATE

Dimitry G. Grabbe, Lisbon Falls, Me., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 27, 1976, Ser. No. 727,307
Int. Cl.[2] H05K 1/12
U.S. Cl. 339—17 CF 4 Claims



1. A connector system for connecting the terminals of a circuit element to conductive areas on the surface of a substrate and comprising:

first and second connector structures;

said first connector structure comprising a first housing shaped as a receptacle and constructed to retain said second connector structure and having resilient, spring-like first terminals with portions extending from the inside of said receptacle to portions external thereof, with the external portions including sections which overlie and are conductively bonded to said conductive areas formed on the surface of said substrate;

said first housing being movable with respect to said substrate through the resiliency of the external portions of said spring-like first terminals; and

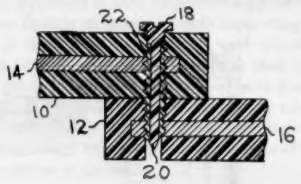
said second connector structure having said circuit element retained therein and having second terminals extending from the terminals of the circuit element externally thereof and frictionally engageable with the internal portions of said first terminals of said first connector structure to make electrical contact therewith and forming means to frictionally retain said second connector structure within said first connector structure.

4,089,576

INSULATED CONNECTION OF PHOTOVOLTAIC DEVICES

Reinhold J. Barchet, Collegeville, Pa., assignor to General Electric Company, Fairfield, Conn.

Filed Dec. 20, 1976, Ser. No. 752,666
Int. Cl.[2] H01R 25/00
U.S. Cl. 339—18 P 3 Claims



1. A fastener for electrically connecting the conductor of one photovoltaic device to that of another comprising:

a nonconducting head and shank;

conducting means on said shank, whereby the electrical connection is made when the shank is positioned in the conductors of said photovoltaic devices; and

said conducting means on said shank has screw threads on its outer surface.

4,089,577

DISTRIBUTING DEVICE FOR A MULTICONDUCTOR CABLE

Lucien Leon Pechard, Dole, and Bernard Andre Logerot, Montsous-Vaudrey, both of France, assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Jan. 28, 1977, Ser. No. 763,737
Claims priority, application France, Feb. 9, 1976, 76 04363
Int. Cl.[2] H01R 29/00
U.S. Cl. 339—18 P 11 Claims

1. A distributing device for interconnecting the incoming conductors of a multiconductor cable to outgoing conductors, said distributing device including at least one modular element comprising:

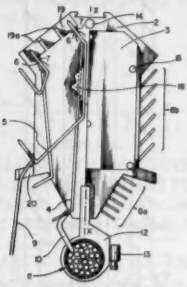
a body of insulating material;

a plurality of contact element pairs, each of said pairs including an incoming contact element and an outgoing contact element and supported by said body, each of said contact elements having two ends, one end of each incoming

contact element adapted to receive and terminate a conductor wire end from one of said incoming conductors and one end of each outgoing contact element adapted to receive and terminate a conductor end from one of said outgoing conductors;

a corresponding plurality of shorting means for interruptably electrically connecting the second end of said incoming element with the second end of said outgoing contact element of each pair;

plug means for making a connection with the second ends of one of said contact element pairs when mated with said



one contact pair in a first orientation relative thereto and for making a connection with the second ends of said one contact element pair and interrupting the connection between said second ends of said one contact element pair when mated with said one contact element pair in a second orientation relative thereto;

said first and second orientations being rotatively related to each other; and

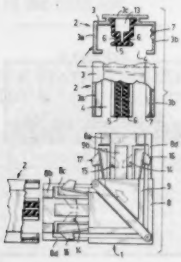
stop means associated with both said plug and said body for blocking said plug from interrupting said connection in said first orientation but permitting such interruption of said connection in said second orientation.

4,089,578

ANGLE PIECE FOR A CONTACT RAIL

Rainer Ilkka Tapio Valtonen, Espoo, Finland, assignor to Oy Nokia AB, Helsinki, Finland

Filed Mar. 29, 1977, Ser. No. 782,554
Claims priority, application Finland, Apr. 1, 1976, 760880
Int. Cl.² H01R 9/00
U.S. Cl. 339—21 R **3 Claims**



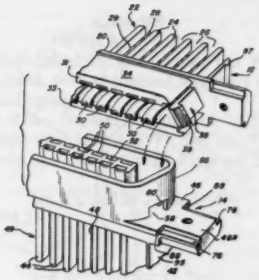
1. An angle piece for a contact rail, comprising: the rail including a support body of U-shaped section having longitudinal conductors placed in a longitudinal groove of said support body eccentrically in relation to sides of said support body, said angle piece having end, portions and an L-shaped body portion which can be pushed into said groove of the support body longitudinally, said L-shaped body portion having at each end portion contact fingers for contacting the conductors in the support body, said contact fingers being placed eccentrically in relation to inner and out flanks of the L-shaped body portion an L-shaped installation component, said contact fingers being mounted onto said installation component supported by said L-shaped body portion and being adjustable in relation to said body portion, said L-shaped installation component being shiftable in relation to the body portion in its diagonal direction so that said contact fingers can be selectively adjusted for coming closer to the inside flank or closer to the outside flank of the body portion.

4,089,579

RIBBON CONNECTOR CONSTRUCTIONS

Thomas M. Steinbach, Park Ridge, Ill., assignor to TRW Inc., Elk Grove Village, Ill.

Filed Apr. 1, 1976, Ser. No. 672,643
Int. Cl.² H01R 13/54
U.S. Cl. 339—91 R **14 Claims**



1. In a ribbon-type connector system the combination comprising:

a ribbon-type receptacle connector having a body of electrically insulating plastic and a plurality of wire engaging contacts fixedly mounted and aligned within said receptacle connector body and accessible to the connector exterior, each of said contacts having a wire termination portion for engaging a wire in electrical contact and a projecting ribbon-type contact mating portion integrally formed with said termination portion, said receptacle connector body having a centrally disposed body portion and a projecting, skirt-like structure with parallel wall portions extending from said centrally disposed body portion in a direction generally parallel to said contact mating portions, said contact mating portions being supportably mounted on opposed facing surfaces of said parallel wall portions;

a ribbon-type plug connector having a body of electrically insulating plastic and a plurality of wire engaging contacts fixedly disposed in said body and accessible to the connector exterior, each of said contacts of said plug connector having a wire termination portion for gripping a wire in electrical contact and a ribbon-type mating portion integrally formed with said termination portion, said plug plastic body including a substantially centrally disposed body portion, said contact termination and mating portions extending in opposite directions from said central body portion, said plug plastic body further having a projecting central support wall extending therefrom for securing the latter contact mating portions in outwardly facing parallel rows, and a skirt fixedly secured to said plug connector body and extending therefrom in encompassing relation with said contact mating portions of the plug, the outwardly facing contact mating portions of said plug connector being adapted to intermate with the opposed matng portions of said receptacle connector contacts in parallel mating rows upon interconnection of

said plug and receptacle connector bodies, said plug connector skirt being adapted to encompass and interfit with said skirt-like structure of said receptacle connector; and

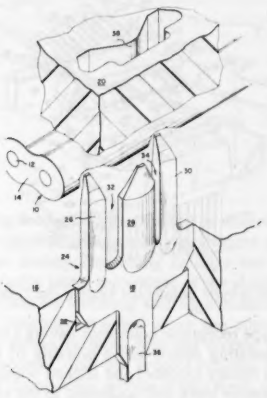
resilient latch and cooperative receptacle means associated with said interfitting plug skirt and said receptacle skirt-like structure for securing said skirt and skirt-like support structure together in their mated relation and thereby securing said connectors in mated engagement against forces tending to separate said connectors.

4,089,580

MULTI-CONTACT CONNECTOR AND CONTACT TERMINAL FOR FLAT CABLE HAVING A PLURALITY OF CONDUCTORS ON CLOSE CENTER LINES

Clifton Wesley Huffnagle, Camp Hill, and James Paul Ward, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 25, 1977, Ser. No. 772,171
Int. Cl.[2] H01R *13/38*
U.S. Cl. 339—99 R **8 Claims**



1. A contact terminal for effecting insulation displacing engagement with a conductor of a multi-conductor cable in which the conductors are on close centerlines, said terminal comprising:

a flat metal plate body having at least three parallel closely spaced tines extending from one edge, each said tine having a concave transverse profile with the concavity of adjacent tines being oppositely directed, said tines lying substantially in a common plane and defining an insulation displacing slot between adjacent pairs of tines; and

a matable portion extending from another edge of said body.

4,089,581

PRINTED CIRCUIT BOARD CONNECTOR

Gary William Schwindt, Sharon, Conn., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed May 3, 1977, Ser. No. 793,308
Int. Cl.[2] H05K *1/07;* H01R *13/06*
U.S. Cl. 339—176 MP **14 Claims**

1. An electrical connector for mounting a printed circuit card upon a printed circuit board, comprising:

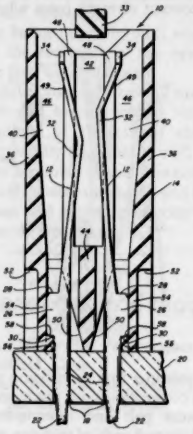
a plurality of conductive contacts aligned in at least one row on said printed circuit board;

said contacts each having a laterally extending contact tab that forms a top and a bottom contact shoulder;

an insulator housing having side walls with top and bottom edges, said side walls joined by webbed means extending perpendicularly between said side walls from the top edges thereof to a point inside and short of said bottom edges to form individual contact-receiving modules open at the tops and bottoms thereof;

said housing having at least one housing tab laterally extending from the bottom edge of said housing side wall into each contact-receiving module;

said housing tab having a top shoulder that engages said bottom contact shoulders for retaining said housing against said printed circuit board, said top shoulder of said



housing tab being below said point inside and short of said bottom edge; and

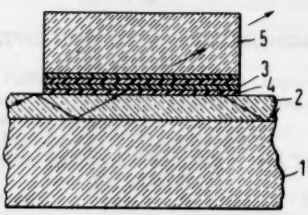
said side walls each having a lower portion between said bottom edge of said side wall and said point inside and short of said bottom edge formed by said webbed means joining said housing side wall, said lower portion forming a flexible member which permits said housing tab to yield from its engagement with said contacts for releasing said housing from said printed circuit board.

4,089,582

NARROW BAND REFLECTION POLARIZER

Hans Mahlein, and Gerhard Winzer, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 18, 1975, Ser. No. 605,260
Claims priority, application Germany, Sep. 11, 1974, 2443511
Int. Cl.[2] G02B *5/14*
U.S. Cl. 350—96.13 **2 Claims**



1. A waveguide structure for masking out specific polarization conditions of a light ray of predetermined frequency utilizing a narrow band reflection polarizer, comprising:

a substrate;

a planar waveguide layer applied onto said substrate, said waveguide having an index of refraction, n_0;

a narrow bandwidth reflection polarizer applied onto said waveguide layer, said polarizer comprising a dielectric

multilayer adjacent said waveguide layer and an absorbant glass plate having an index of refraction n_s adjacent said dielectric multilayer;

said dielectric multilayer being comprised of two alternating layers, one layer having an index of refraction n_1, the other layer having an index of refraction n_2, with $n_o < n_1$, $n_1 < n_2$ and $n_s > n_1$;

said layers having the same effective optic layer thickness equal to odd integrals of $\frac{1}{4}\lambda_1$, wherein λ_1 is a wavelength of an incident unpolarized electromagnetic wave selected from the range extending from the ultraviolet through infrared regions, traveling through said waveguide layer;

and said waveguide structure having a refractive index structure defined by:

$$n_s(n_1, n_2)^K n_o$$

wherein K = 1,2,3, ...

4,089,583

METHOD FOR MAKING OUTPUT/INPUT COUPLER FOR MULTI-MODE GLASS FIBERS

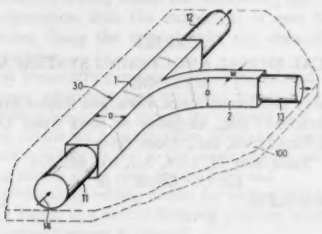
Franz Auracher, Munich, and Ralf Kersten, Rottach-Egern, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 4, 1977, Ser. No. 774,663

Claims priority, application Germany, Mar. 5, 1976, 2609143

Int. Cl.² G02B 5/16; G03B 37/00

U.S. Cl. 350—96.15 **8 Claims**



1. A coupler for use with multi-mode glass fibers to couple-out and couple-in a light signal to the glass fibers comprising a substrate, and a main line having a square cross section disposed on said substrate to extend between spaced ends of a pair of fibers disposed on the substrate, said main line having at least one integral branch line extending on said substrate therefrom, said branch line having a rectangular cross section smaller than the cross section of the main line and having one surface coplanar with a surface of the main line.

4,089,584

MULTIPLE STATION MULTIPLEXED COMMUNICATIONS LINK EMPLOYING A SINGLE OPTICAL FIBER

Christopher E. Polczynski, Rancho Palos Verdes, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Oct. 29, 1976, Ser. No. 737,178

Int. Cl.² G02B 5/14; H04B 9/00

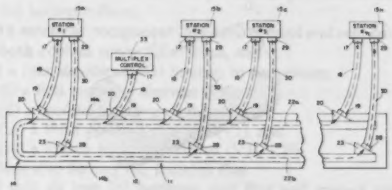
U.S. Cl. 350—96.16 **10 Claims**

1. A communications link for multiplexing a plurality of stations comprising:

a single optical fiber having a core cross-section having at least one planar side and arranged in an open loop configuration to form a pair of legs, the legs of said loop being placed side by side to form a paired line cable which runs between said stations,

input coupler means at each station for coupling optical signals from said station onto one of the legs of said loop for transmission solely in a first direction,

output coupler means at each station for coupling optical signals traveling only in a direction opposite to said first direction from the other of the legs of said loop to each of said stations,



said input and output coupler means comprising optical coupling devices adapted to couple optical signals to and from said fiber without breaking or splicing said fiber core.

4,089,585

OPTICAL GUIDES

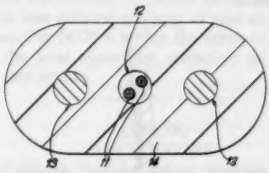
Raymond Jeffrey Slaughter, Chislehurst, and Patrick Vassar Andrews, London, both of England, assignors to BICC Limited, London, England

Continuation of Ser. No. 640,799, Dec. 15, 1975, abandoned. This application Mar. 4, 1977, Ser. No. 774,331

Claims priority, application United Kingdom, Dec. 18, 1974, 54688/74

Int. Cl.² G02B 5/14, 5/16

U.S. Cl. 350—96.23 **13 Claims**



1. An optical guide in the form of a flexible optical cable comprising at least two optical fibres and, surrounding the fibres, an overall outer protective sheath, wherein each individual optical fibre of at least some of the optical fibres has a continuous coating of a metallic material a few micrometers in thickness wholly surrounding the individual fibre protecting the individual fibres during manufacture from the atmosphere and damage by mechanical contact with other bodies and providing optical screening from neighboring fibres after assembly.

4,089,586

SINGLE MODE OPTICAL TRANSMISSION LINE

William George French, Plainfield, and G. William Tasker, Summit, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

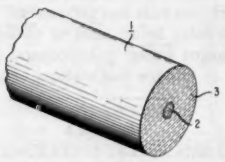
Filed Jun. 23, 1976, Ser. No. 699,070

Int. Cl.² G02B 5/14

U.S. Cl. 350—96.30 **6 Claims**

1. A single mode glass transmission line for electromagnetic energy having a wavelength between 0.5μm and 2.0μm, said line consisting essentially of a core having a first refractive index, said core having a radius less than 12μm, and a clad having a second refractive index, said clad surrounding said core, said first refractive index exceeding said second refractive index; characterized in that said core and said clad consist essentially of SiO_2 and B_2O_3, the ratios of SiO_2/B_2O_3 concentrations within said core and said clad being within the range

between 3:1 and 30:1, said ratio in said core exceeding said ratio in said clad by an amount such that the difference between said first refractive index and said second refractive



index is less than approximately $(2.4\lambda)^2/(8\pi^2a^2n)$ where λ is said wavelength, a is said radius and n is said first refractive index.

4,089,587

PROJECTION SCREEN SURFACE AND METHOD OF FORMING SAID SURFACE

Conrad R. Schudel, 7415 Convoy Ct., San Diego, Calif. 92111

Continuation-in-part of Ser. No. 527,974, Nov. 29, 1974, abandoned. This application Apr. 23, 1976, Ser. No. 679,610

Int. Cl.² G03B *21/56*

U.S. Cl. 350—125 **33 Claims**

1. In a projection screen including a structural backing and a reflective element overlying said backing, an improved reflective element comprising a transparent film metallized on one surface and having a second, opposite matte surface, said film mounted to said structural backing so that the metallized surface is adjacent the structural backing and the matte surface of the transparent film is exposed in order that light from a projector or other source passes through the matte surface of the film to be reflected by the metallized surface and the metallized surface is protected from damage, one of said surfaces of the transparent film including elongate striations in a single direction to relatively evenly spread the reflected image over a predesignated area.

25. A method of forming a projection screen comprising the steps of:

providing a film of at least partially deformable, resilient material and having a forward surface including a random matte texture;

brushing the forward surface of the film to provide said film with a substantially unidirectional striated texture in combination with said matte texture; and

depositing a layer of reflective material on the forward surface of the film to provide a high gain, damage resistant reflective surface on the forward surface of said film.

4,089,588

NEMATIC LIQUID CRYSTALLINE MIXTURE OF α-CYANOSTILBENES AND APPLICATION THEREOF IN IMAGE DISPLAY DEVICES

Maarten de Zwart, and Theodorus Wilhelmus Lathouwers, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 21, 1976, Ser. No. 725,169

Claims priority, application Netherlands, Sep. 25, 1975, 7511277

Int. Cl.² C09K *3/34*; G02F *1/13*

U.S. Cl. 350—350 **5 Claims**

1. A liquid crystalline material comprising a nematic liquid crystalline mixture of α-cyanostilbene compounds with negative electric anisotropy, characterized in that in a temperature range around room temperature the mixture is nematic liquid crystalline and contains the compounds 2-(p-ethoxyphenyl)-3-(p-hexyloxyphenyl)-acrylonitrile and 2-(p-butoxyphenyl)-3-(p-heptylphenyl)-acrylonitrile in a weight ratio of about 1 to 2 or the compounds 2-(p-butoxyphenyl)-3-(p-pentyloxyphenyl) acrylonitrile and 2-(p-methoxyphenyl)-3-(p-pentylphenyl) acrylonitrile in a weight ratio of about 1 to 2.

4,089,589

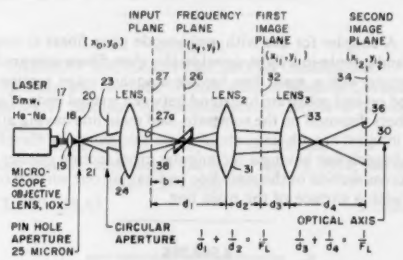
OPTICAL SIGNAL PROCESSING SYSTEM AND METHOD

William Harry Brockman, Ames, Iowa, and Robert Frank Cannata, Torrance, Calif., assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed May 11, 1976, Ser. No. 685,270

Int. Cl.² G02B *5/18*

U.S. Cl. 350—162 SF **15 Claims**

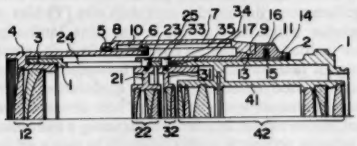


13. A method of simultaneously processing first and second input signals comprising: optically recording said signals respectively on first and second transparencies such that the light amplitude transmission of each transparency is representative of the associated input signal along an information axis, placing said first and second transparencies in juxtaposed position with their respective information axes at an angle greater than zero at an input plane; illuminating said transparencies with a converging beam of monochromatic light focused on a frequency plane to directly form an image representative of the product of the Fourier transforms of the frequency spectra of the optical records on said first and second transparencies at said frequency plane; spatially filtering said light on said frequency plane along a predetermined axis transverse of said path; and focusing the light passing through said spatial filter onto an image plane such that one of the convolution and correlation of said input signals appears on said image plane.

4,089,590
ZOOM LENS BARREL HAVING MACRO-PHOTOGRAPHING MECHANISM

Shigeyoshi Sakata, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 23, 1976, Ser. No. 725,742
Claims priority, application Japan, Oct. 6, 1975, 50-119818
Int. Cl.[2] G02B 15/16, 15/18
U.S. Cl. 350—187 12 Claims

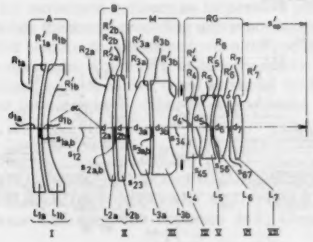


1. A zoom lens mechanism which effects zooming and macro-focusing by means of lenses including focusing lenses and a magnifying lens group, comprising:
- a fixed lens barrel;
- a first carrying means movable along an optical axis and carrying focusing lenses;
- a second carrying means movable along said optical axis and carrying a magnifying lens group;
- a first operating means exteriorly manually operable, movable along and rotatable about said optical axis;
- a second operating means movable along said optical axis in cooperation with the movement of said first operating means along the optical axis, and manually exteriorly rotatable;
- a first transmitting means for moving of said first carrying means when said first operating means is rotated;
- magnification-setting means for moving said second carrying means for magnification when said second operating means is moved due to the movement of said first operating means along said optical axis; and
- macro-focusing setting means for setting said second carrying means to a macro-focusing position when said second operating means is rotated.

4,089,591
EXTREMELY HIGH SPEED OBJECTIVE

Erhard Glatzel, Heidenheim, and Heinz Zajadatz, Essingen, both of Germany, assignors to Carl Zeiss Stiftung, Oberkochen, Germany

Filed Mar. 22, 1976, Ser. No. 669,265
Claims priority, application Germany, Mar. 22, 1975, 2512797
Int. Cl.[2] G02B 13/04
U.S. Cl. 350—214 10 Claims



1. A very high speed lens with wide angular field of view, comprising, in succession from front to rear,
(1) a first component (A) of negative power, said first component including all lens elements located in front of the below mentioned second component, the most strongly curved air-contacting surface of said first component being the rear surface of such component and being concave toward the rear,
(2) a second component (B) of positive power, spaced rearwardly from said first component to provide an air lens (α) between them,
(3) a meniscus component (M) having front and rear surfaces both convex toward the front, and
(4) a rear member (RG) having, in succession,
(i) a first negative element (IV),
(ii) a second negative element (V),
(iii) a third positive element (VI), and
(iv) a fourth positive element (VII, LP)

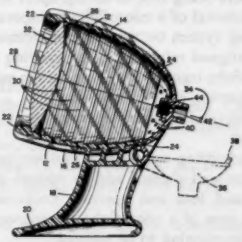
said lens also having the features that
(5) said air lens (α) between said first and second components has front and rear surfaces which are of unequal curvature and both of which are convex toward the front,
(6) the sum of the surface refractive powers of said first negative element (IV) is not more than 0.90 times the sum of the surface refractive powers of said second negative element (V),
(7) said third positive element (VI) is close to said second negative element (V),
(8) said fourth positive element (VIII) is spaced rearwardly from said third positive element (VI) to provide an air lens (δ) between them, and
(9) the sum of the surface refractive powers of said first mentioned air lens (α) is less than 0.185 times the total equivalent refractive power (Φ) of the entire lens system,

said lens being characterized by the novel features that
(a) the absolute numerical value of the quotient (Q) of the paraxial refractive power (ϕ_{LP}) of said fourth positive element (VII, LP) divided by the sum of the refractive powers of all surfaces of said first negative component (A) is within the limits of 1.370 and 2.015, and
(b) the air lens refractive power of said air lens (δ) in said rear member (RG) is within the limits of 1.370 and 1.795 times the total equivalent refractive power (Φ) of the entire lens system.

4,089,592
MICROSCOPE

Patrick J. Cudmore, Duxbury, Mass., assignor to Wave-Rider, Incorporated, Duxbury, Mass.

Filed Feb. 9, 1976, Ser. No. 656,608
Int. Cl.[2] G02B 27/02
U.S. Cl. 350—235 15 Claims



1. A microscope comprising:
(a) a hollow, tubular Fresnel lens having a viewing end, a viewed end, and a tubular light-transmitting lens wall, at least one surface of said tubular lens wall having a plurality of axially spaced-apart, circular Fresnel grooves cut therein:
(i) said Fresnel grooves being sawtooth-shaped in cross-section;
(ii) said Fresnel grooves having circumferentially circular groove bottoms, said circular bottoms being co-axial and lying in substantially parallel planes which planes are substantially perpendicular to the lens wall axis;

(iii) the diameters of said Fresnel groove bottoms being substantially nonincreasing in the direction of said viewed end;

(iv) said Fresnel grooves refracting incident external light rays generally towards said viewed end;

(b) a magnifying lens mounted in co-axial relation to said Fresnel lens wall axis, said magnifying lens being substantially focused on said viewed end; and

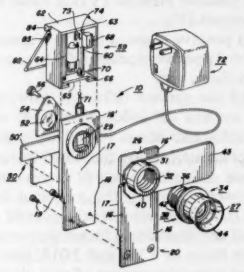
(c) a bottom wall affixed to and closing the viewed end of said Fresnel lens wall.

4,089,593

PORTABLE VIEWER

Stanley E. Bernard, Webster; Soto F. Flouris, and Edward C. Malhoit, both of Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sep. 20, 1976, Ser. No. 724,887
Int. Cl.[2] G02B *27/02*
U.S. Cl. 350—236 **9 Claims**



1. A device for viewing a microfiche transparency having discrete image areas arranged thereon in X — Y coordinates, comprising:

support means forming a viewing station, said support means including

first and second elongated members, and

means attaching said members together in substantially parallel spaced relationship adjacent one end thereof whereby the inner walls of said members form a slot-like opening therebetween adjacent the free end thereof for receipt of a microfiche transparency, the free ends of said members being free to spring apart to facilitate insertion and removal of a microfiche transparency therebetween;

a viewing system on said support means arranged in optically aligned relationship for viewing the image area of a microfiche transparency disposed in said slot-like opening, said viewing system including

a lens disposed on said first member adjacent the free end thereof,

a light admitting aperture in said second member adjacent the free end thereof and in optical alignment with said lens, said lens and aperture cooperating to enable the image area of a microfiche transparency disposed in said slot-like opening to be viewed,

light diffusing means selectively interposable across said aperture,

auxiliary lamp means for illuminating the microfiche transparency in said slot-like opening, and

means for releasably attaching said auxiliary lamp means to the outside wall of said second member in overlaying relationship with said aperture whereby on energization of said auxiliary lamp means the image area of the microfiche transparency in said slot-like opening is illuminated for viewing thereof; and

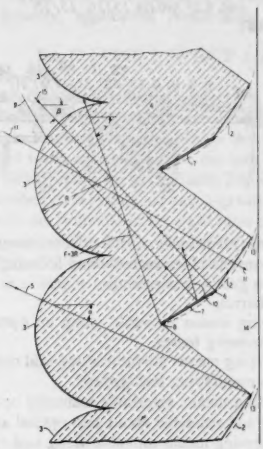
interlock means to inhibit attaching of said auxiliary lamp means to said second member except when said light diffusing means is interposed across said aperture.

4,089,594

SUN SCREEN STRUCTURE

James Coe Ewin, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jun. 13, 1977, Ser. No. 805,813
Int. Cl.[2] G02B *17/00, 27/00;* F24J *3/02*
U.S. Cl. 350—262 **9 Claims**



1. A sun screen structure for controlling solar heating of a building, said structure comprising:

an array of optical lenses located adjacent to the exterior of one or more surfaces of said building, each of said lenses focusing sunlight onto its respective focal plane; and

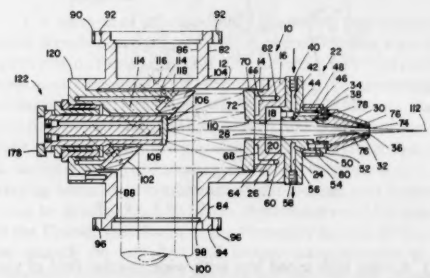
means located in the focal plane of each of said lenses for reflecting towards the exterior of said building sunlight of a first prescribed range of angle of elevation with respect to the horizontal and for transmitting towards the interior of said building sunlight of a second prescribed range of angle of elevation with respect to the horizontal.

4,089,595

MOUNTING ARRANGEMENT FOR RIGHT ANGLE CASSEGRANIAN TELESCOPE REFLECTOR SYSTEM

Gerald P. Simmons, Washington; Hiram A. Brubaker, Peoria; William E. Streight, East Peoria, and Robert W. Brown, Chillicothe, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 23, 1976, Ser. No. 716,846
Int. Cl.[2] G02B *5/10*
U.S. Cl. 350—294 **5 Claims**



1. An optical system for directing a beam of corpuscular energy comprising a housing defining a central, longitudinal axis, said housing defining a side opening adapted for receiving a beam of corpuscular energy which is directed from a direc-

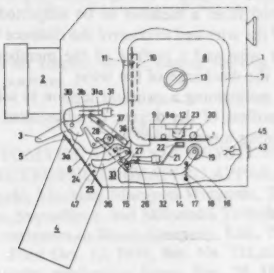
tion substantially perpendicular to said central, longitudinal axis, a first mirror fixedly mounted in said housing at a position to receive a beam directed in said direction, said first mirror being mounted at an angle to said central, longitudinal axis so that the beam is directed substantially in an axial direction, a concave second mirror fixedly mounted in said housing on said central, longitudinal axis and spaced from said first mirror so as to receive a reflected beam and reflect it back to impinge upon a third mirror, said third mirror also being positioned on said central, longitudinal axis, and means movably mounting said third mirror in three directions being said longitudinal (X) axis direction, said (Y) axis direction substantially perpendicular to said longitudinal axis, and a (Z) axis direction substantially perpendicular to a place defined by said longitudinal axis and said direction substantially perpendicular to said longitudinal axis, further including a centrally located bore in said first mirror, and wherein said means movably mounting said third mirror comprises a generally cylindrical mirror mount member supported by a pair of circumscribing eccentric annular members, said pair of members being of different size whereby a first inner annular member fits within a second outer annular member, and wherein said outer annular member fits within said bore, said annular members being dimensioned with respect to each other so that relative rotation of said inner and outer members causes motion in two directions, being the Y and Z axis directions whereby the position of said third mirror about said central, longitudinal axis may be adjusted.

4,089,596

SOUND MOTION-PICTURE CAMERA

Fritz Krumbein, Stuttgart-Mohringen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Feb. 22, 1977, Ser. No. 770,825
Claims priority, application Germany, Feb. 21, 1976, 2607145
Int. Cl.² G03B *31/02*
U.S. Cl. 352—27 **15 Claims**



1. In a sound motion-picture camera of the type provided with a sound-recording unit including at least one component mounted for movement between an inoperative position to be assumed when the sound-recording unit is not in operation and an operative position to be assumed when the sound-recording unit is in operation, a plurality of independently activatable moving means each operative when activated for moving the component from one to the other of its positions.

4,089,597

STEREOSCOPIC MOTION PICTURE SCANNING REPRODUCTION METHOD AND APPARATUS

Robert Bruce Collender, 709 Patterson Ave., Glendale, Calif. 91203

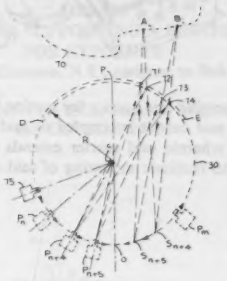
Filed Mar. 11, 1976, Ser. No. 666,158
Int. Cl.² G03B *35/00*
U.S. Cl. 352—53 **4 Claims**

1. The method of recording and reproducing stereoscopic views for observation by plural observers without visual aids at the eyes of said observers, comprising:

(a). Photographing multiple sequential views of a scene from a motion picture camera in a manner such that between each sequential view relative motion takes place between the camera and scene, and the optical axis of the camera for the various views is essentially coincident or parallel with each other;

(b). Reproducing said views sequentially by projecting the views from a scanning projector onto a screen; said scanning projector being positioned, during the projection of successive views, at successive positions about the arc of a circle, with the optical axis of the projector always pointing toward the center of the circle so as to project the image to said screen on the opposite side of the center of the circle;

(c). Said screen being stationary and comprised of elementary vertical sections having horizontal corrugated ridges to vertically scatter incident light rays from said projector



and so oriented that a light ray projected from said projector at one of said successive positions and passing through the center of said circle to said screen will be reflected to pass through the arc of said circle at a point which is the mirror reflection of the position of the scanning projector about a line drawn from the mid point of the scanning arc of the projector to the center of the circle, the reflected ray being substantially parallel to said line;

(d). Said screen elementary vertical sections so oriented that the picture projected from said projector at one of said successive positions may be viewed in its entirety by an eye located anywhere along a vertical line intersecting said circle at said mirror reflection of the position of said projector; and

(e). The scanning of said projector being at a rate sufficient to be within the period of persistence of vision of an observer.

4,089,598

PHONOGRAPH DEVICE

Burton C. Meyer, Downers Grove; Alex Imatt, Chicago, and Derek R. Brand, Naperville, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Jan. 21, 1977, Ser. No. 761,293
Int. Cl.² G03B *21/30, 31/06, 23/10*
U.S. Cl. 353—17 **14 Claims**

1. An audio-visual phonograph device, comprising:

a housing,

a cover pivotally mounted on said housing, said cover including means for displaying a light transmitted image,

a phonograph turntable rotatably mounted in said housing,

drive means for rotating said turntable,

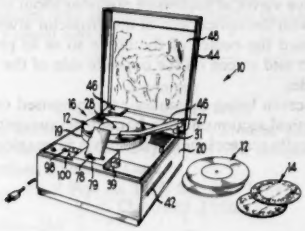
reproducing means for phonographically transmitting sound from a record placed on said turntable,

at least one visual image disc having continuous images thereon generally about the periphery thereof,

a discrete image disc carrier rotatably mounted in said housing,

projecting means for projecting at least a portion of the images from said visual image disc onto said displaying

means, gear means coupling said turntable to said disc carrier for synchronizing the rotation of said turntable and said carrier such that the carrier is driven at a continuous, predetermined rate of rotation whereby the sound transmitted by said transmitting means corresponds to the continuously moving image projected from said disc onto said displaying means and



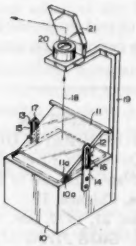
means supporting said carrier for motion between a position wherein said carrier is coupled to said gear means and a position wherein said carrier extends outwardly of said housing to facilitate mounting of said disc onto said carrier.

4,089,599

DEVICE FOR CORRECTING DISTORTION OF A PROJECTED IMAGE

Makoto Kuboshima, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Nov. 8, 1976, Ser. No. 739,786
Claims priority, application Japan, Nov. 18, 1975, 50-138374
Int. Cl.² B03B *21/00*
U.S. Cl. 353—70 **4 Claims**



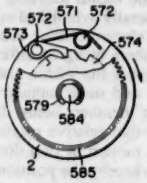
1. A device for correcting the distortion of an image projected by a projector on a projection screen comprising a positive or negative correcting lens provided between a transparency loaded in a projector and a projection lens of the projector, and means for moving said correcting lens continuously between a first position in which the lens is perpendicular to the optical axis of the projection lens and a second position in which the lens is inclined at an angle with respect to a plane perpendicular to the optical axis of the projection lens, said last-mentioned means including means for restricting the movement of the central portion of said correcting lens to a path along said optical axis when the correcting lens is moved from its first position to its second position.

4,089,600

CORONA DISCHARGE DEVICE FOR ELECTROPHOTOGRAPHIC COPYING MACHINE

Yoshio Ito, Kokubunji; Hajime Katayama; Hiroshi Nitanda, both of Tokyo, and Masaru Yamaguchi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 576,299, May 12, 1975, abandoned, which is a division of Ser. No. 348,093, Apr. 5, 1973, Pat. No. 3,883,240, which is a division of Ser. No. 120,132, Mar. 2, 1971, Pat. No. 3,784,297. This application Feb. 2, 1976, Ser. No. 654,389
Claims priority, application Japan, Mar. 11, 1970, 45-20075; Apr. 15, 1970, 45-32112
Int. Cl.² G03G *15/02*
U.S. Cl. 355—3 CH **3 Claims**



1. Corona discharger having a shield casing formed with a longitudinal opening defined by opposed shield plates and a discharge wire extending between two longitudinal ends of said shield casing, said corona discharger comprising:
- a spring for stretching the discharge wire;
- means for supporting the discharge wire in a portion of said shield casing inwardly of said shield plates and between said two longitudinal ends of said shield casing; and
- adjusting means for adjusting the position of said supporting means within said shield casing to maintain said discharge wire spaced from a member to be subjected to the discharge of the wire and to control the distance between the discharge wire and a surface of the member to be subjected to the discharge of the wire;
- said spring maintaining a constant tension in said discharge wire regardless of the degree of adjustment effected by said adjusting means.

4,089,601

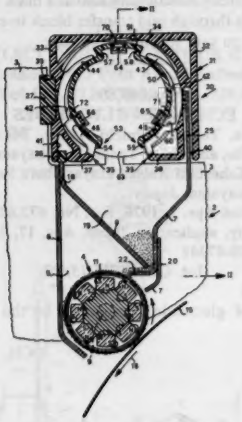
DISPOSABLE TONER CARTRIDGE FOR COPYING MACHINES

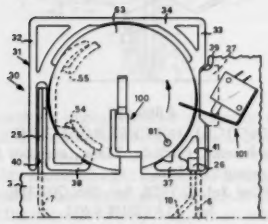
Lorenzo Navone, Turin, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Feb. 11, 1977, Ser. No. 767,786
Claims priority, application Italy, Feb. 16, 1976, 67342/76
Int. Cl.² G03G *15/00*; B67D *5/64*
U.S. Cl. 355—14 **3 Claims**

1. A cartridge for containing and supplying developing powder in a copying machine, comprising:
- a casing having a first opening;
- a container for the developing powder mounted inside said casing, having a second opening and movable with respect to said casing from a position of containment of the developing powder to a position of discharge of the developing powder, in which the first and second openings are aligned and the developing powder is discharged through said opening; and,

means for clamping said container in said second discharge position to prevent any subsequent movement of the con-





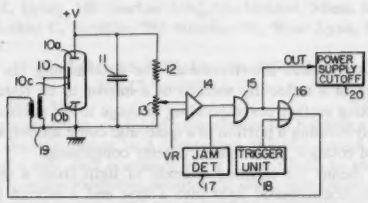
tainer with respect to the casing starting from the discharge position.

4,089,602

AUTOMATIC SHUTDOWN SYSTEM FOR ELECTROPHOTOGRAPHIC APPARATUS

Koichi Noguchi, Machida; Masayosi Watanuki, Tokyo; Takeshi Narimatsu, Sagamihara, and Mitsutaka Yoshida, Machida, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 12, 1976, Ser. No. 731,168
Claims priority, application Japan, Dec. 20, 1975, 50-152115
Int. Cl.² G03B *27/76*
U.S. Cl. 355—69 **3 Claims**



1. In an electrophotographic apparatus including a flash tube constituting an imaging light source, a discharge capacitor connected across the flash tube, power source means for charging the capacitor, a cutoff means for cutting off the power source means and a failure detector for sensing a failure condition of the apparatus and producing an electrical failure signal in response thereto, the combination comprising:

voltage sensing means for sensing whether a voltage across the capacitor is sufficient to fire the flash tube and producing an electrical enable signal while said voltage is sufficient; and

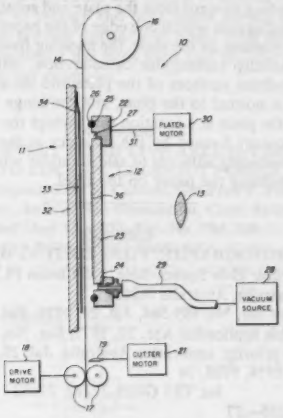
failure trigger signal generating means responsive to the failure signal and the enable signal for producing an electrical failure trigger signal to fire the flash tube and cutoff the power source means in response to the failure trigger signal and the enable signal in coincidence.

4,089,603

APPARATUS FOR SUPPORTING A PRINTING PLATE FOR EXPOSURE

Robert D. Jacobs, Geneseo, N.Y., assignor to Itek Corporation, Lexington, Mass.

Filed Nov. 16, 1976, Ser. No. 742,322
Int. Cl.² G03B *27/60*
U.S. Cl. 355—73 **15 Claims**



1. Optical imaging apparatus comprising:

A. an imaging station including an optical imaging system having an image plane; and,

B. means for supporting a photosensitive sheet in the image plane of said optical imaging system for exposure thereat, said supporting means comprising:

a. a cover plate assembly including a cover plate means;

b. a backing plate assembly including a relatively rigid backing plate member and a relatively flexible sheet;

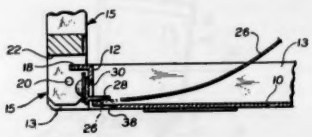
c. means for producing relative movement between said cover plate assembly and said backing plate assembly to bring them into contact with one another with said photosensitive sheet supported therebetween, said cover plate assembly including means for clamping said relatively flexible sheet against said relatively rigid backing plate member to define an air-tight chamber between said cover plate assembly and said relatively flexible sheet; and,

d. means for evacuating said chamber, the evacuation of said chamber causing said relatively flexible sheet to be moved towards said cover plate assembly to push said photosensitive sheet firmly against said cover plate means whereby said photosensitive sheet will be held flat against said cover plate means and in said image plane of said optical imaging system for exposure.

4,089,604
EASEL WITH MASKING FRAME

Frederic B. Handsman, Bayside, N.Y., assignor to Ehrenreich Photo-Optical Industries, Inc., Garden City, N.Y.

Filed Oct. 13, 1976, Ser. No. 731,943
Int. Cl.[2] G03B *27/58*
U.S. Cl. 355—74 9 Claims

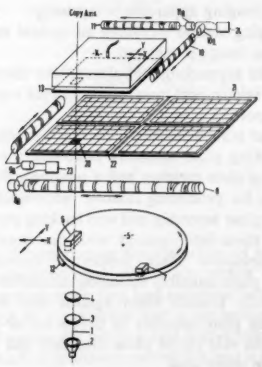


1. An easel for holding paper for photo-enlarging, including in combination a plate on which a sheet of photographic paper rests, a frame that holds the paper against the plate and that provides a mask around an area of the paper that is to be exposed, a hinge at one side of the plate and by which the mask is connected with the plate, the hinge being positioned for movement of the mask into a working position supported from the plate and parallel to the plate with just one sheet of paper between the masking frame and the plate, a shoulder having a face extending upward from the plate and substantially normal thereto and against which one edge of the paper contacts when placed in position on the plate, the masking frame having a side of substantially rectangular cross-section, adjacent sides of which confront surfaces of the plate and shoulder where the shoulder is normal to the plate, and the hinge connecting the frame to the plate at a location that swings the masking frame into the corner formed by the shoulder at the surface of the plate immediately adjacent to said shoulder when the masking frame is holding the paper on the easel.

4,089,605
PHOTOGRAPHIC FILM EDITING DEVICES

Harry Arthur Hele Spence-Bate, 115 Cheam Pl., Morley, Western Australia, Australia (6062)

Division of Ser. No. 599,586, Jul. 28, 1975, Pat. No. 4,047,813.
This application Apr. 20, 1977, Ser. No. 789,295
Claims priority, application Australia, Jul. 29, 1974, 8365/74; Nov. 21, 1974, 9705/74
Int. Cl.[2] G03B *27/42, 27/32*
U.S. Cl. 355—77 4 Claims



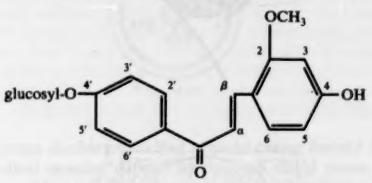
1. A method of editing a microfiche or microfilm which comprises placing an image on said microfiche or microfilm in alignment with an image frame on a second unexposed microfiche held in a copy axis, said alignment being according to the frame position required for the image to be recorded on the second microfiche; pressing the two films together onto a light transfer block, said light transfer block being a solid member through which light can pass and conforming in size and shape to said image thereby functioning also as a mask for said image, and passing light through said transfer block to expose only the required frame on said second microfiche.

4,089,606
ECHINATIN GLYCOSIDES

Tsutomu Furuya, Tokyo; Shinichi Ayabe, Tokosuka; Miyuki Kobayashi, Ube, and Tadao Tanimoto, Okayama, all of Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama, Japan

Filed Apr. 1, 1976, Ser. No. 672,623
Claims priority, application Japan, Apr. 17, 1975, 50-47240; Apr. 17, 1975, 50-47241
Int. Cl.[2] C07H *15/20*
U.S. Cl. 536—4 1 Claim

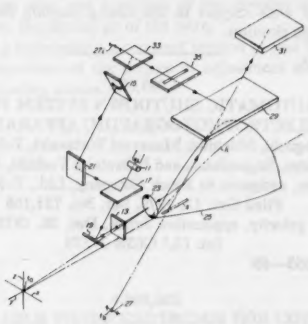
1. Echinatin-4'-glucoside, represented by the formula



4,089,607
OPTICAL INTERFEROMETER

Werner R. Rambauske, Carlisle, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Jul. 2, 1976, Ser. No. 702,180
Int. Cl.[2] G01B *9/02*
U.S. Cl. 356—109 5 Claims



1. An optical interferometer for determining the optical quality of a reflecting surface of a mirror to be tested, such reflecting surface corresponding in shape to the surface generated by rotating a portion of a quadratic conic section about an axis of rotation, such interferometer comprising:

(a) means for splitting a beam of light from a source of monochromatic light into a first and a second beam of light, such first and second beam being coherent with each other;

(b) means for directing the first beam of light toward the reflecting surface of the mirror to be tested, such reflecting surface then directing such first beam toward a viewing screen as through such beam originated at a focal point of such reflecting surface; and

(c) means for directing the second beam of light toward the viewing screen, the path of each ray in the second beam

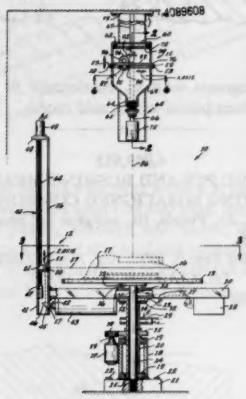
falling on such screen being the conjugate of the path of each corresponding ray in the first beam falling on such screen.

4,089,608

NON-CONTACT DIGITAL CONTOUR GENERATOR

Howard W. Hoadley, 9413 Petit Ave., Sepulveda, Calif. 91343

Filed Oct. 21, 1976, Ser. No. 734,600
Int. Cl.² G01B *9/00*
U.S. Cl. 356—156 **11 Claims**



1. A non-contact digital contour generator for generating the X, Y and Z coordinates of the surface of a three-dimensional model comprising:

an adjustably mounted light source for successively providing contour lines about said model at different levels thereof, the movement of said light source being measured to provide a first of said coordinates;

a camera having an object plane and an image plane, said camera having its optical axis disposed perpendicular to the plane of the contour line and adjustably mounted such that its object plane is maintained in the plane of the contour line as the latter is changed to a different level so as to focus the image of the contour line on said image plane; and

scanning means including photosensitive means located in the image plane of said camera for scanning the successive images of the contour lines focussed thereon to provide the second and third of said coordinates.

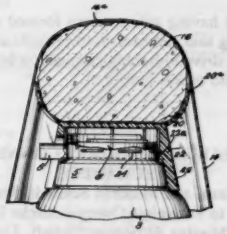
4,089,609

COMBINATION APPLICATOR AND CLOSURE CAP MEANS FOR SHAVING CREAM CONTAINERS

Frank M. Gring, 100 Harbor Ave., Marblehead, Mass. 01945, and Arthur C. Sordillo, 783 Summer St., West Lynn, Mass. 01905

Filed Oct. 15, 1976, Ser. No. 732,954
Int. Cl.² A45D *33/02*
U.S. Cl. 401—130 **1 Claim**

1. In combination a cylindrical container for holding a pressurized shaving cream and dispensing shaving cream onto fingers of a user, said container being formed with an annular shoulder portion extending around the outer side thereof and terminating in a cylindrical rim presenting outwardly projecting spaced apart lug portions, a dispensing nozzle extending laterally outwardly from the rim, a valve actuating member movable inside the rim to release pressurized lather, a cylindrical cap and applicator device for receiving discharged shaving cream and holding the discharged shaving cream out of contact with the fingers of a user, said cylindrical cap device being internally recessed to provide a cylindrical wall fitted around the said rim, said cylindrical wall being formed with an outwardly projecting annular rib portion located in a position to engage beneath the lug portions and detachably secure the cap device on the container, the lower side of the cap device being extended downwardly to form an annular handle which is engageable with an outer portion of the said annular shoulder to protectively house the valve actuating member, a portion of the handle being recessed to form a slot through which the dispensing nozzle is received, the upper side of the cap



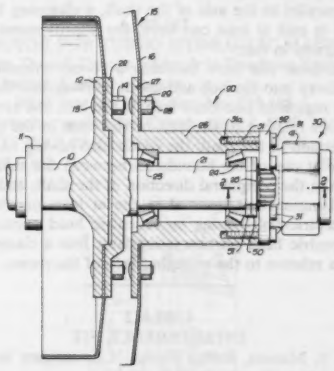
device being formed with a bowl-shaped liquid receptacle, a hydrophilic applicator body secured in the receptacle for receiving pressurized cream from the container when the handle is detached therefrom and said bowl-shaped receptacle being operative to receive and hold liquid during a shaving operation and to prevent discharge of liquid from the applicator after the applicator has been used and the cap device is re-engaged with the container.

4,089,610

KIT TO CONVERT FIXED LIVE AXLE ON MOTOR VEHICLE TO LOCK-IN, LOCK-OUT POWER HUB

Richard M. Kleespies, 3780 El Camino, and Fred F. Parke, 3993 Mountain Ave., both of San Bernardino, Calif. 92404

Filed May 13, 1977, Ser. No. 796,769
Int. Cl.² B60B *27/02*; F16D *1/06, 11/00*
U.S. Cl. 403—1 **2 Claims**



1. A kit for converting a fixed live axle on a motor vehicle to a lock-in lock-out power hub wherein the outer end of said live axle terminates in a brake drum supporting flange provided peripherally with a series of bolt holes and bolts inserted therein and on which a drive wheel disc is normally fixed by said bolts, the combination of:

a relatively short stub axle provided at its inner end with a flange which is perforated at its periphery to replace said drive wheel disc and be secured by the aforesaid bolts to said vehicle fixed axle flange;

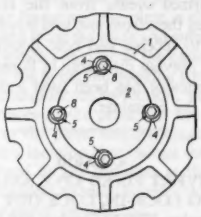
a tubular wheel hub having a flange extending radially from its inner end, said flange corresponding in diameter and

having bolt holes positioned therein correspondingly to the bolt holes in said previously recited flanges;
a set of bolts for securing said wheel hub flange to said drive wheel disc; and
bearing means rotatably mounting said tubular wheel hub on said stub axle and providing for free rotation of said hub on said axle while limiting axial movement thereon;
said tubular wheel hub having bolt hole means on its outer end for use in securing a hub clutching mechanism thereto;
said stub shaft having spline means formed on its outer end for engaging said mechanism to provide an optional lock-in, lock-out drive clutching connection between said stub shaft and said wheel hub.

4,089,611
RELEASABLE HUB-SHAFT CONNECTION MECHANISM

Ernst Riegler, Enns, and Manfred Schmidt, Linz, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Dec. 9, 1976, Ser. No. 749,107
Claims priority, application Austria, Dec. 17, 1975, 9572/75
Int. Cl.² F16D *1/06*
U.S. Cl. 403—358 **8 Claims**



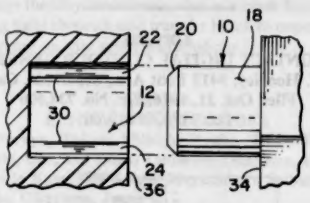
1. In a releasable hub-shaft connection mechanism, in particular to be used in heavy machinery, for transmitting strong torques, with a shaft, a hub surrounding the shaft, and at least one bore penetrating the shaft and the hub and having an axis that is parallel to the axis of the shaft, a clamping bolt being inserted in said at least one bore, the improvement which is characterised in that:
the at least one bore becomes a recess extending about halfway into the hub and about halfway into the shaft in the region of one front face of the hub, the recess being off-set relative to the axis of the bore in the peripheral direction of the shaft, the recess also having an engaging face at one of the boundaries between the shaft and the hub in the peripheral direction of the shaft; and
the clamping bolt inserted in the at least one bore is an eccentric bolt having an eccentric head portion, which eccentric head portion is rotatable into a clamping position relative to the engaging face of the recess.

4,089,612
INTERFERENCE FIT

Charles F. Mazzeo, Scotch Plains, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed Dec. 29, 1976, Ser. No. 755,416
Int. Cl.² F16B *2/00*
U.S. Cl. 403—361 **9 Claims**

1. An improved interference fit between a substantially cylindrical shaped shaft and a substantially cylindrical shaped recess for fastening separate members together constructed from synthetic polymeric material, wherein the improvement comprises first and second spaced longitudinal ridges formed on an internal cylindrical surface of said recess, said first and second ridges being positioned within a 180° angular segment of said surface, said shaft engaging each of said ridges and a different segment of said cylindrical surface upon inserting said shaft in said recess, said inserted shaft being proportioned relative to said recess to be both suspended and seized within said recess at solely three points comprising each said ridge and

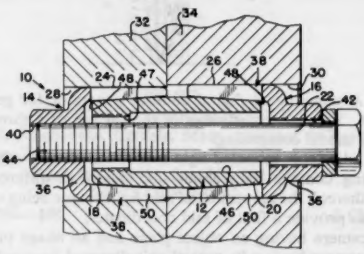


said different segment with an interference fit between said shaft and said three points within said recess.

4,089,613
ECCENTRIC PIN AND BUSHING MEANS FOR MOUNTING MISALIGNED COMPONENTS

John H. Babbitt, Jr., Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 9, 1977, Ser. No. 767,001
Int. Cl.² F16B *2/14, 13/06*
U.S. Cl. 403—388 **5 Claims**



1. A pin-type connector for interconnecting a pair of members having nominally aligned through-bores without requiring true alignment of the bores, said connector comprising:
a cylindrical cup-shaped bushing element having a bottom and an upstanding wall, said wall being discontinuous whereby the same may be expanded into tight frictional engagement with a bore and having a frusto-conical interior surface;
a fastener-receiving bore in said bottom;
a pin element at least partially received in said bushing and having a frusto-conical outer surface engaging said interior surface;
a fastener-receiving bore in said pin; and
fastening means received in said fastener-receiving bores for drawing said pin into said bushing to expand said wall;
at least one of said frusto-conical surfaces being slightly eccentric with respect to the longitudinal axis of the element on which it is formed.

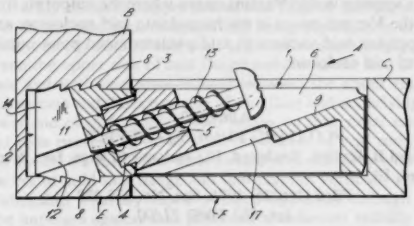
4,089,614
FURNITURE CONNECTOR

David N. Harley, Bournemouth, England, assignor to ITW Limited, Windsor, England

Filed May 9, 1977, Ser. No. 794,873
Claims priority, application United Kingdom, May 12, 1976, 19514/76; Feb. 15, 1977, 6201/77
Int. Cl.² B25G *3/00*
U.S. Cl. 403—407 **15 Claims**

1. A furniture connector assembly including a plug, a fastener, and a grommet wherein said plug has a substantially

cylindrical shape and has at least one flat side face, said plug being further formed with a spigot extending radially and obliquely from said flat side face with respect to the axis of said plug, said spigot including a bore extending the entire length of said spigot, and said grommet including a substantially cylin-



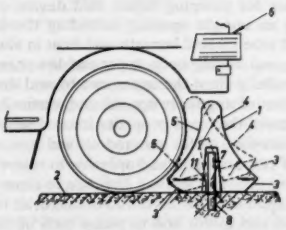
drical shank and having a locating surface at one of its ends to abut the free end of said spigot on said plug, said grommet also having a bore passing through said shank, said bore being inclined to the axis of said shank of said grommet, said fastener passing, in use, through said bore in said spigot of said plug and into said inclined bore in said grommet shank.

4,089,615

CONCRETE BLOCK, PRIMARILY INTENDED FOR USE AS A ROAD BARRIER

Bengt Önnert Almér, Saltholmsgatan 55, Vastra Frolunda, Sweden (421 76), and Karl Gunnar Gidlöf, Sjogangen 28, Vastra Frolunda, Sweden (421 71)

Filed May 4, 1977, Ser. No. 793,615
Claims priority, application Sweden, May 11, 1976, 7605335
Int. Cl.² E01F *13/00*
U.S. Cl. 404—6 **7 Claims**



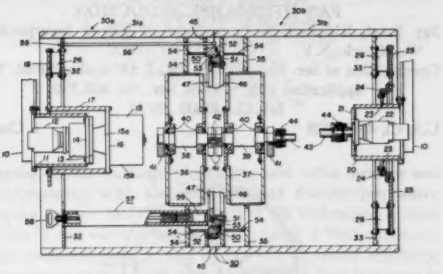
1. A traffic barrier for roadways comprising multiple modules arranged in end-to-end relationship along a roadway to form a substantially continuous barrier, each module of the barrier having a comparatively wide flat base and beveled shoulders rising from opposite sides of said base in diverging angular relationship, each module having above said beveled shoulders and on opposite sides of the module concave longitudinally extending faces whose heights above the beveled shoulders define the major portion of the height of each module and the height of said barrier, and each module having at least one anchoring recess in its bottom to receive loosely an upstanding roadway anchor element with enough clearance to allow substantial lateral tilting of each module on its beveled shoulders and some sliding on said flat base when either concave face of the module is engaged by the wheel of a vehicle moving along the roadway, each module being substantially self-righting by gravity after tilting.

4,089,616

VIBRATORY SPLIT ROLL

Louis F. Fairchild, Cedar Rapids; Harlan M. Jones, Mechanicsville, and Vernon L. Schrimper, Cedar Rapids, all of Iowa, assignors to Iowa Manufacturing Company, Cedar Rapids, Iowa

Filed May 6, 1977, Ser. No. 794,606
Int. Cl.² E01C *19/38*
U.S. Cl. 404—117 **20 Claims**



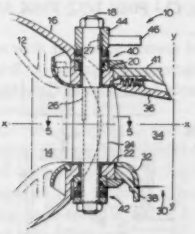
1. In a road roller including at least one steerable roll having at least two co-axially adjacent roll shells providing a substantially continuous cylindrical road engaging surface, mounting means for the roll shells permitting vibratory movement thereof relative to remaining portions of the roll, the mounting means further providing for rotation of the roll shells relative to each other, and vibratory means effective upon each roll shell, the improvement wherein the mounting means includes bearing means disposed between the adjacent axial ends of the roll shells effective to permit said rotation thereof relative to each other, the bearing means being further disposed sufficiently adjacent the periphery of the roll shells so that the bearing means by itself is effective to prevent displacement of the roll shells from said co-axial relationship.

4,089,617

DISTRIBUTOR FOR TURBO HYDRAULIC MACHINES

Paul Koeller, Dorval, Canada, assignor to Dominion Engineering Works Limited, Lachine, Canada

Filed Aug. 26, 1976, Ser. No. 718,148
Claims priority, application Canada, Sep. 3, 1975, 234727
Int. Cl.² F01B *25/10*; F01D *9/00, 17/16*; F03B *3/18*
U.S. Cl. 415—163 **10 Claims**



1. An annular volute-shaped scroll vessel for use with a turbo-machine selected from a turbine and pump-turbine, to provide a flow path of progressively changing section for use with pressurized liquid, to receive a machine runner in mounted relation in the center of the volute, with the runner main axis extending substantially normally to the plane of the volute, the cross-sectional shapes of the volute normal to the plane thereof having a fixed substantially arcuate wall terminating at an unobstructed mouth slot extending as an annulus, a plurality of rod-like tension tie members arranged in mutually

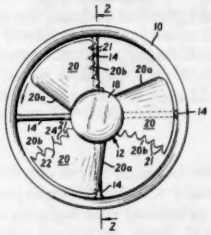
spaced relation about the periphery of the mouth extending across the mouth in tensile tying relation therewith, each tie member subtending an arc of a respective pitch circle of the volute section, and a plurality of wicket gates located in mutually spaced relation around said slot, being mounted on respective ones of said tie members for pivotal positioning about the longitudinal axis of the gate.

4,089,618

FAN WITH NOISE REDUCTION

Jay Patel, Kingston, N.Y., assignor to Rotron Incorporated, Woodstock, N.Y.

Continuation of Ser. No. 485,289, Jul. 2, 1974, abandoned. This application Feb. 5, 1976, Ser. No. 655,550
Int. Cl.² F04D *29/38*
U.S. Cl. 416—228 **8 Claims**



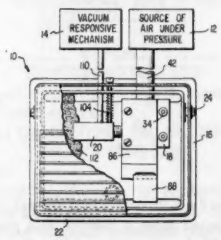
1. A reduced noise fluid moving device comprising a plurality of blades rotatable in unison about an axis to cause fluid flow in a direction generally parallel to said axis, each of said blades having leading and trailing edges with respect to the direction of fluid flow, the trailing edge of each of said blades having a series of notches along its length to cause turbulence conditions as the fluid leaves the blade, the notches in all of said blades being of equal size and constant pitch and the series of notches along the edges of respective ones of said blades being longitudinally displaced from each other by an amount less than the pitch of said notches.

4,089,619

TREADLE-OPERATED VACUUM SUPPLY DEVICE

Loring E. Young, Jefferson, and William J. Siegel, Silver Spring, both of Md., assignors to Pace Incorporated, Silver Spring, Md.

Continuation-in-part of Ser. No. 464,436, Apr. 26, 1974, abandoned. This application Jul. 25, 1975, Ser. No. 599,034
Int. Cl.² F04F *5/52*; F16K *31/62*
U.S. Cl. 417—54 **11 Claims**



8. A method of supplying a vacuum to a predetermined point, said method comprising the steps of

applying air under pressure to a valve means disposed within an enclosure comprising a base member and a treadle member pivotally mounted with respect to said base, said valve means being responsive to depression of said treadle member for actuation of the valve means to its open position;

depressing said treadle member with the foot of an operator to thereby open said valve means;

directing the output air from said valve means to a Venturi means disposed within said enclosure to thereby establish a vacuum in said Venturi means where the output air from the Venturi means is discharged into said enclosure; and

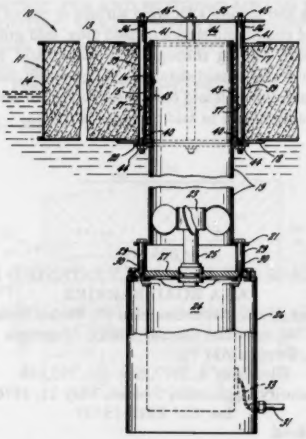
supplying said vacuum to said predetermined point outside of said enclosure.

4,089,620

FLOATING PUMPING DEVICE

Richard B. Ravitts, Rockford, Ill., assignor to Riga, Inc., Rockford, Ill.

Filed Oct. 26, 1976, Ser. No. 735,438
Int. Cl.² F04B *21/00*
U.S. Cl. 417—61 **7 Claims**



1. A device for pumping liquid, said device comprising a float having an upright opening extending therethrough, an upright draft tube located beneath said float in alinement with said opening and having open upper and lower ends, a flange projecting radially from the upper end of said draft tube and having a series of angularly spaced and vertically extending apertures formed therein, a propeller located within said draft tube, a submersible motor secured to and spaced from the lower end of said draft tube and operable to rotate said propeller about an upright axis and in a direction to cause said propeller to draw liquid into the lower end of said draft tube between said tube and said motor and to pump such liquid out of the upper end of said draft tube, upright holes extending through said floating and spaced angularly around said opening in alinement with the apertures in said flange, a diffuser plate having angularly spaced apertures alined with said holes and the apertures, in said flage, threaded rods extending through said holes and sized to extend into the apertures in said flange and said plate and having a vertical dimension greater than the vertical dimension of said float, means on the upper ends of said rods for preventing the upper ends of said rods from sliding downwardly through said holes and the apertures in said plate, means on the lower ends of said rods and engageable with said flange to draw said flange upwardly relative to said rods, and a series of tubular spacers having inside diameters sufficiently large to receive said rods and having outside diameters sufficiently large to prevent said spacers from moving through said holes and the apertures in said flange and said plate, said spacers and said plate being positionable on the upper end portions of said rods with the spacers located between the upper side of said float and the lower side of said

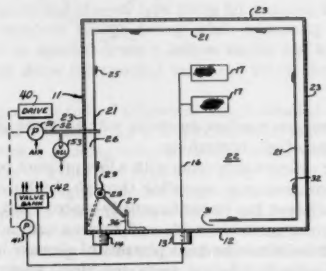
plate and with said plate spaced above and overlying the upper end of said opening and clamped against the upper ends of said spacers by said means on the upper ends of said rods, said means on the lower ends of said rods holding the upper side of said flange in engagement with the lower side of said float whereby liquid pumped upwardly through said draft tube passes upwardly through said opening and is deflected radially outwardly across the upper side of said float by said plate, said spacers and said plate alternatively being positionable on the lower end portions of said rods with said spacers located between the upper side of said flange and the lower side of said plate and with said plate located between the upper ends of said spacers and the lower side of said float and underlying the lower end of said opening, said means on said upper ends of said rods preventing downward movement of said rods, and said means on said lower ends of said rods coacting with said spacers to hold said flange and said plate in vertically spaced relationship whereby liquid pumped upwardly through said tube impinges against said plate and is deflected radially outwardly between said flange and said plate.

4,089,621

SELECTIVELY PRESSURIZED TANK FOR HYDRAULIC FLUID

Wilburn Kelly Brown, Morton Grove, Ill., assignor to Pettibone Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 525,850, Nov. 21, 1974, Pat. No. 3,976,124. This application Aug. 18, 1976, Ser. No. 715,412
Int. Cl.² F04F *1/06*
U.S. Cl. 417—118 **3 Claims**



1. A hydraulic system including a hydraulic pump, a tank for hydraulic fluid, an inflow connection leading into the tank and an outflow connection leading from the tank to the hydraulic pump; an air pump connected in open communication with the tank upon normal initial operation of the hydraulic pump, and effective whenever the hydraulic pump is driven for supplying pressurization above the fluid in the tank to supply the fluid to the hydraulic pump under pressure and minimize the sucking in of air at the hydraulic pump; drive means for driving said air pump whenever the hydraulic pump is driven and not thereafter; and means for promptly and completely dissipating air pressure in the tank when the air pump is not driven; the drive shaft of the hydraulic pump being at least as high as the hydraulic fluid in the tank.

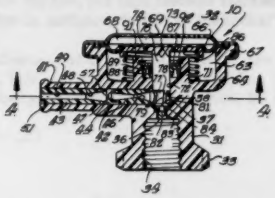
4,089,622

VACUUM GENERATOR

John Anton Aubel, and Clarence Dennis Fox, both of Decatur, Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Jun. 22, 1976, Ser. No. 698,572
Int. Cl.² F04F *5/52*
U.S. Cl. 417—188 **1 Claim**

1. A vacuum generator comprising a body, including an inlet port adapted for communication with a source of motive fluid, a passage, a valve seat disposed in said passage, ejector means communicating with said passage, a vacuum port communicating with said ejector means, a fluid control chamber adjacent said passage including valve operator means, a valve member extending between said control chamber and said passage, said valve member being connected to said valve operator means and mounted in said body for sliding movement toward and from closure with said valve seat in response to movement of said valve operator means, and a pressure responsive friction



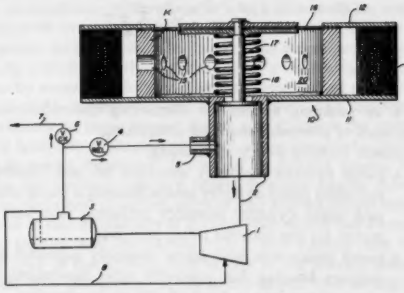
damping device frictionally engaging said valve member and communicating with said passage, said friction responsive damping device including a resilient lip embracing a stem portion of said valve member, said lip being in fluid communication with said passage, said lip exerting increased resistance to movement of said valve stem while motive fluid is present in said passage.

4,089,623

COMPRESSOR INTAKE CONTROL

Rudolf Hofmann, Jr., Diedenbergen, Germany, assignor to Sullair Schraubenkompressoren GmbH, Munich, Germany

Filed Dec. 30, 1975, Ser. No. 645,435
Claims priority, application Germany, Jan. 2, 1975, 2500040
Int. Cl.² F04B *49/00*
U.S. Cl. 417—295 **5 Claims**



1. In combination with an air compressor having an inlet and an outlet, an intake flow control comprising:
an intake flow passage connecting the compressor inlet with the ambient atmosphere;
a movable throttle valve adapted to seal against a valve seat in said intake flow passage when moved to a closed position to prevent communication between the compressor inlet downstream and the ambient atmosphere upstream;
means for biasing said throttle valve toward the closed position against said valve seat;
means responsive to the difference between atmospheric pressure and the pressure in said flow passage for positioning said throttle valve, said throttle valve being moved to an open position when atmospheric pressure exceeds the pressure in said intake flow passage by an amount sufficient to overcome said biasing means;
a relief line connected between the compressor outlet and said intake flow passage at a point between said throttle valve and the compressor inlet; and
a relief valve in said relief line for delivering compressed air

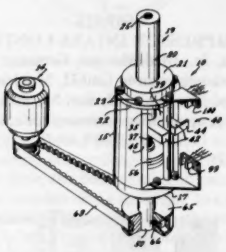
from the compressor outlet to said intake flow passage when the pressure at the compressor outlet exceeds the relief valve setting so that the pressure in said intake flow passage downstream of said throttle valve increases and said throttle valve is closed.

4,089,624

CONTROLLED PUMPING SYSTEM

Philip Thorbus Nichols, and Paul Jene Watts, both of Salt Lake City, Utah, assignors to Becton, Dickinson and Company, East Rutherford, N.J.

Filed Jun. 4, 1976, Ser. No. 692,897
Int. Cl.² F04B 35/04
U.S. Cl. 417—362 10 Claims



1. A pumping system for dispensing controlled variable amounts of pumpable material comprising:

means forming a support housing,

a pump cylinder assembly mounted on said housing and including pump cylinder means forming a pump chamber, said pump cylinder assembly including inlet and outlet means for the material being pumped,

a pump piston and lead screw assembly mounted on said support housing for generally axial movement of the pump piston into and out of said pump chamber,

driven nut means rotatably mounted in said support housing and receiving said lead screw,

stationary seal means positioned at one end of said pump cylinder assembly and forming a fluid tight seal between said piston and pump cylinder means preventing leakage between said piston and pump chamber,

said seal means being a distance from said drive nut which remains fixed during movement of said pump piston whereby the geometry between the seal means and said pump piston is maintained the same during movement of said pump piston relative to said seal means,

said pump piston including an outer peripheral surface spaced from the opposing surface of said pump chamber and movable in sealing contact relative to said stationary seal means,

means mounted on said pump piston and lead screw assembly to prevent rotation thereof, and

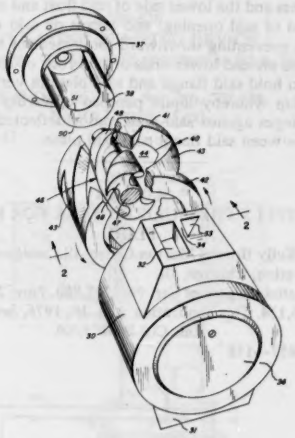
motor means connected to effect rotation of said driven nut means whereby said pump piston is reciprocated relative to said pump cylinder assembly for pumping and filling said pump chamber.

4,089,625

ROTARY GAS MACHINE

Rudolf Hofmann, Jr., Deidenbergen, Germany, assignor to Comprotek, S. A., Munich, Germany

Filed Dec. 19, 1975, Ser. No. 642,609
Claims priority, application Germany, Dec. 21, 1974, 2460752; Jul. 14, 1975, 2531385; Jul. 14, 1975, 2531415; Jul. 22, 1975, 2532751
Int. Cl.² F01C 1/10, 11/00, 19/04, 21/00
U.S. Cl. 417—440 60 Claims



1. A rotary gas machine operating with a change of volume and pressure of gas, comprising:

an outer cylindrical housing with a low pressure port and a high pressure port extending through the housing wall and adjacent, but circumferentially spaced apart, therein;

a cage rotor rotatable inside said housing and including a cylindrical sleeve having a plurality of alternate longitudinally extending helical teeth and slots, adjacent teeth having side wall surfaces which are radial with respect to the center of the cage rotor and define a slot therebetween, each of said slots communicating successively with said ports as the sleeve rotates;

a lobe rotor rotatable inside and in synchronism with said cage rotor with the rotational axes of the two rotors being parallel, the lobe rotor having a plurality of helical lobes which mesh with the helical slots of the cage rotor as the rotors turn, each of said lobes having oppositely disposed lateral peripheral edges which seal with the corresponding side wall surfaces defining the slot with which it meshes, the outer peripheries of the rotors being substantially tangent along a line parallel with the rotor axes and lying between said ports;

a first gear connected to said cage rotor;

a second gear connected to said lobe rotor and engaged with said first gear, said gears synchronizing rotation of the rotors; and

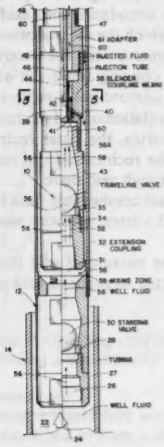
a crescent-shaped inner housing member between the cage and lobe rotors diametrically opposite said tangent line, the crest of the helical lobe of the lobe rotor effectively moving axially along the cooperating slot of the cage rotor as the lobe and slot mesh along said tangent line to vary the slot volume between a maximum with the slot in communication with the low pressure port and a minimum with the slot in communication with the high pressure port.

4,089,626

INJECTOR PUMP

Homer Hill, and Alfred L. Dunn, both of Tulsa, Okla., assignors to Dover Corporation, Tulsa, Okla.

Filed Dec. 22, 1975, Ser. No. 642,749
Int. Cl.² F04B *39/02, 39/06*
U.S. Cl. 417—431 **3 Claims**



1. A barrel and plunger type pump for pumping liquid from a deep borehole though tubing while permitting a treating liquid to be injected down a hollow sucker rod to mix with well fluid above the standing valve and below the travelling valve;

(a) a pump barrel of substantial length adapted to be supported in well tubing at a selected level, said barrel supporting a standing valve immersed in the well liquid by means of a first thin cylindrical tube;

(b) pump plunger means of length greater than said barrel adapted to sealably reciprocate in said barrel and including a traveling valve in the bottom of said plunger means, said traveling valve being inside of and of smaller diameter than said first thin tube, and than said plunger, whereby the clearance between said traveling valve and said first thin tube is greater than between said plunger and said barrel;

(c) a mixing zone comprising the volume inside said first thin tube between said standing valve and said traveling valve;

(d) blender coupling means connected between said traveling valve and said plunger means;

(e) a second thin tube or injection tube connected to and extending upwardly of said blender coupling means, and including means to flow well fluid through said blender coupling means upwardly between said injection tube and said plunger means upwardly between said injection tube and said plunger means, to a point above said plunger means and said barrel;

(f) discharge cage means comprising a cylindrical coupling connected to the top of said plunger means and having at least one opening through its wall, and seal means between said discharge cage means and said injection tube above said openings; and

(g) hollow sucker rod means connected to said discharge cage means;

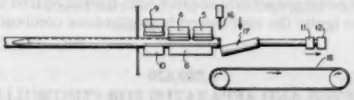
whereby treating liquid is forced down said sucker rods, through said blender coupling means, below said plunger means, and downwardly in the annulus between said standing valve and said first thin tube to said mixing zone, where it mixes with the incoming liquid from said standing valve, and the mixture flow upwardly through said blender coupling means and between said injection tube and said plunger means to the annulus above said barrel.

4,089,627

APPARATUS FOR THE PRODUCTION OF PIPE-TYPE ARMORED SEPARATORS FOR STORAGE BATTERIES

Georgi Nikolov Mishev, and Iliya Stoilkov Haralampiev, both of Sofia, Bulgaria, assignors to DSO "Balkankar", Sofia, Bulgaria

Continuation-in-part of Ser. No. 525,973, Nov. 21, 1974, abandoned. This application Sep. 22, 1975, Ser. No. 615,725
Claims priority, application Bulgaria, Nov. 21, 1973, 25038
Int. Cl.² B29G *5/00*
U.S. Cl. 425—303 **3 Claims**



1. An apparatus for the production of corrugated pipe-type armoured separators comprising alternating first and second sets of shaping rods and driving rods, wherein the shaping rods are adapted to be positioned in respective first and second sets of parallel channels in a lengthwise woven cloth, while the length of said shaping rods is greater than the length of a curing furnace means disposed to receive said cloth and shaping rods, and first and second sets of jaws having both lateral and vertical movement, onto which, by means of elastic elements there are fastened shaped means for engaging said shaping rods and cloth channels, the planes of symmetry of said shaped means fastened to one of the sets of jaws passing through the center lines of the first set of shaping rods and being perpendicular to the plane in which these rods lie, while the planes of symmetry of said shaped means of the other set of jaws passes through the center lines of the second set of shaping rods, a third, laterally stationary set of jaws having fastened thereto by means of a further elastic element shaped means for engaging said shaping rods and cloth channels, and the planes of symmetry of these shaped means pass through the center lines of both sets of shaping rods and are perpendicular to the plane in which these rods lie; a pair of driving combs, for moving said driving rods in a lateral direction having movement in the lateral direction, each of said driving combs being attached to one of said sets of driving rods which has a cross-section smaller than the cross-section of said shaping rods, the center lines of the driving rods of one of the driving combs coincide with the prolongations of the center lines of one of said sets of shaping rods, while those of the other driving comb have center lines coincident with said other set of shaping rods.

4,089,628

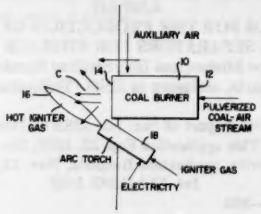
PULVERIZED COAL ARC HEATED IGNITER SYSTEM

Philip Richard Blackburn, West Redding, Conn., assignor to Union Carbide Corporation, New York, N.Y.

Filed Feb. 17, 1976, Ser. No. 658,741
Int. Cl.² F23N *5/00*; F23M *3/00*
U.S. Cl. 431—6 **4 Claims**

1. Method of igniting pulverized coal suspended in an air stream comprising introducing an igniter gas selected from the group consisting of air, oxygen, mixtures of air and oxygen or mixtures of air or oxygen with other oxidizing, non-combustible or inert gases under pressure into a gas chamber having an exit nozzle, creating a vortex flow of said igniter gas through said gas chamber, establishing an electric arc between a pair of electrodes inside said gas chamber to heat the igniter gas to extremely high temperatures whereupon the gas emerges from said chamber through said exit nozzle in the form of a high velocity igniter gas jet composed predominantly of highly chemically active, ionized and dissociated species of said ig-

niter gas, the temperature of said high velocity gas jet being in the range of from about 5,200° to about 15,000° F, and directing said igniter gas jet into contact with the pulverized coal-air stream to ignite the coal through spontaneous combustion.



4,089,629

PROCESS AND APPARATUS FOR CONTROLLED RECYCLING OF COMBUSTION GASES

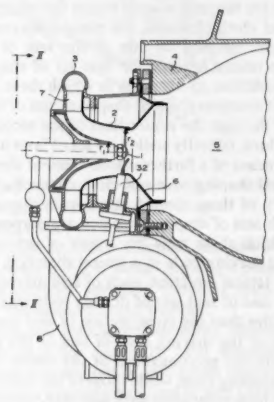
Henri Baumgartner, Bernex; André Jacquemet, Grand-Lancy, both of Switzerland; John George Meier, San Diego, Calif., and Bernard Vollerin, Geneva, Switzerland, assignors to Pietro Fascione, Busto Arsizio (Varese), Italy

Filed Feb. 6, 1976, Ser. No. 656,079

Claims priority, application Switzerland, Feb. 12, 1975, 1706/75; Dec. 15, 1975, 16208/75

Int. Cl.² F23M *3/00*

U.S. Cl. 431—9 **7 Claims**



1. A process for combusting a fuel in a burner having a nozzle for dispensing a combustible fluid, a combustion chamber downstream of said nozzle, and a distribution opening upstream of said nozzle and communicating with said chamber around said nozzle, said method comprising the steps of:

(a) generating a zone of reduced pressure upstream of said opening;

(b) communicating said zone simultaneously with a source of an oxygen-containing gaseous comburant and with said chamber whereby said reduced pressure in said zone draws said gaseous comburant and recycled combustion gas from said chamber through a common duct;

(c) mixing the stream of gaseous comburant with the stream of recycled combustion gas in said duct by subdividing one of said streams into a multiplicity of flows and dispersing said multiplicity of flows in the other of said stream, thereby producing a comburant mixture with an oxygen concentration substantially less than that of said gaseous comburant;

(d) controlling the mass-flow rate of said mixture to substantially completely burn a combustible fluid supplied by said nozzle to said chamber;

(e) controlling the oxygen concentration in said mixture to slightly exceed the stoichiometric requirement of oxygen for combustion of said fluid;

(f) introducing said mixture into the combustion chamber through said opening and imparting a turbulent flow to the mixture introduced into said chamber through said opening in which the ratio between the kinetic momentum flux of the mixture and the product of the radius of said distribution opening times the axial movement quantity flux of said mixture has a value at least sufficient to produce a recirculation of said mixture within said chamber in a toroidal vortex, the latter recirculation being independent from the recirculation of combustion gas from said chamber through said duct;

(g) directing said combustible fluid from said nozzle through said toroidal vortex whereby said fluid mixes therewith; and

(h) burning the mixture of said fluid and the gases of said toroidal vortex to produce said combustion gases in said chamber.

4,089,630

PROCESS FOR MIXING TWO FLUIDS AND APPARATUS FOR CARRYING OUT THIS PROCESS

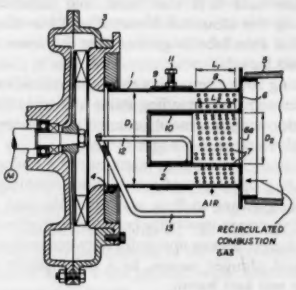
Bernard Vollerin, Geneva, and Henri Baumgartner, Bernex, both of Switzerland, assignors to Pietro Fascione, Milan, Italy

Filed Apr. 22, 1976, Ser. No. 679,435

Claims priority, application Switzerland, Dec. 11, 1975, 16078/75

Int. Cl.² F23L *7/00*

U.S. Cl. 431—9 **10 Claims**



1. A process for mixing two fluids comprising the steps of:

generating a pressure drop across a pair of surfaces each forming a wall of a mixing chamber and confronting one another while separating a respective source of fluid from the mixing chamber, the surfaces being provided with mutually aligned and opposing apertures accelerating the respective gases through said apertures in opposing jets; and

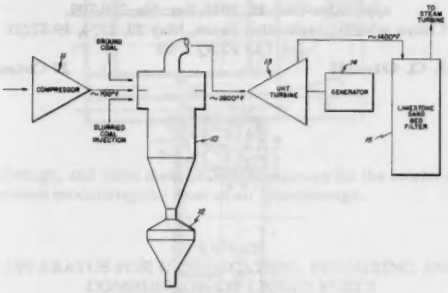
conducting the resulting mixture of said fluids away from said chamber substantially parallel to said surfaces, said jets being directed against one another at velocities of the order of 50 m/sec.

4,089,631

COAL-BURNING GAS TURBINE COMBUSTION SYSTEM FOR REDUCING TURBINE EROSION

Walter B. Giles, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 23, 1976, Ser. No. 725,696
Int. Cl.[2] F23M 9/00
U.S. Cl. 431—9 21 Claims



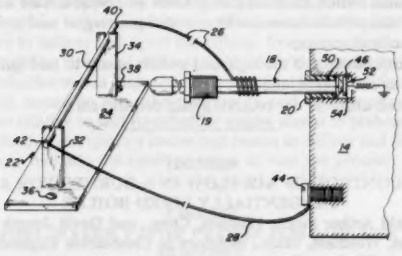
1. A combustion system for burning coal comprising:
combustor means including a substantially conical-to-cylindrical surface;
a fluidized bed of ground coal;
mixing means combining a liquid fuel with elutriated coal fines from said fluidized bed to form a slurry;
means coupling said mixing means to said cyclone combustor means for supplying said slurry adjacent the inner surface of said cyclone combustor means; and
means coupling said fluidized bed to said cyclone combustor means for supplying ground coal particles above a predetermined size from said fluidized bed to a region radially-inward of said slurry in said cyclone combustion means.

4,089,632

FUEL CONTROL SAFETY APPARATUS

Basil E. Rexroad, Rte. #1 - Box 383 A, Palisade, Colo. 81526

Filed Sep. 1, 1976, Ser. No. 719,424
Int. Cl.[2] F23N 5/10
U.S. Cl. 431—21 7 Claims



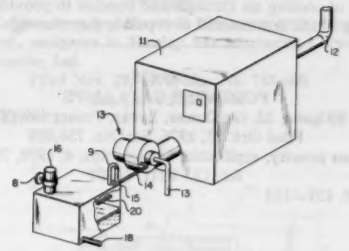
1. A fuel control safety apparatus for preventing continued overfiring of a burner means comprising:
thermocouple means adapted to generate an electrical current in response to temperature;
fuel control means adapted to automatically feed fuel to said burner means when activated by the current from said thermocouple means;
fusible link safety means having a fusible filament adapted to melt at a predetermined temperature, said fusible link safety means being disposed above and in front of said burner means; and,
circuit means connecting the fusible filament of said fusible link safety means in series with said thermocouple means and said fuel control means such that when said predetermined temperature is attained and said fusible filament melts, the electrical current from said thermocouple means to said fuel control means ceases thereby deactivating said fuel control means and stopping the flow of fuel to said burner means;
wherein said thermocouple means is physically connected to said fuel control means by a threaded electrical insulating means surrounding said thermocouple to prevent direct grounding of said thermocouple means to said fuel control means.

4,089,633

COMBUSTION VAPOR GENERATOR

Alexander S. Barghout, 52 Whittier Rd., Milton, Mass. 02186, and Richard A. Washak, 47 Wachusett Rd., N. Weymouth, Mass. 02191

Filed Mar. 29, 1976, Ser. No. 671,268
Int. Cl.[2] F23J 7/00
U.S. Cl. 431—208 7 Claims



1. A vapor generator for combustion improvement comprising,
a vessel of water,
means for maintaining the level of said water,
oily chemical solution for forming a layer on said water,
pump means for drawing water from the bottom of said vessel to the top of vessel under pressure,
jet spray means for receiving said pumped water and spraying jets into the oily chemical solution covered water whereby bubbles of water, air and trace amounts of chemicals are released into the atmosphere of said vessel,
means for conducting said vapor filled air to the intake of a burner firing a combustion chamber to aid in the combustion of fossil fuels.

4,089,634

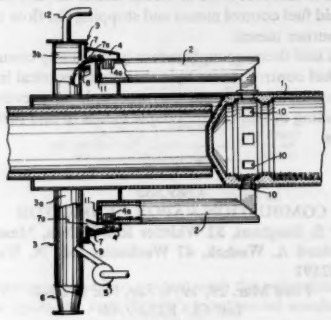
PLANETARY COOLER SYSTEM FOR ROTARY KILN PLANT AND THE LIKE

Karl J. Sylvest, Copenhagen, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Filed Jul. 16, 1976, Ser. No. 705,872
Claims priority, application United Kingdom, Jul. 23, 1975, 30860/75
Int. Cl.[2] F27D 15/02
U.S. Cl. 432—80 19 Claims

1. A planetary cooler system for cooling hot material such as cement clinker exiting from a rotary kiln which comprises a plurality of cooler tubes mounted in planetary fashion about the rotary kiln, each tube having a material inlet end portion communicating with a material outlet end portion of the kiln and a material outlet end portion, at least one elongated conduit positioned generally upright and having an opening in its upper end portion, said opening being positioned generally opposite the position of each cooler tube when the tube is generally at its uppermost position such that as each cooler tube rotates to its approximate uppermost position, material passes from the material outlet end portion of said tube,

through said opening and into said elongated conduit for passage through the elongated conduit, and means for controlling



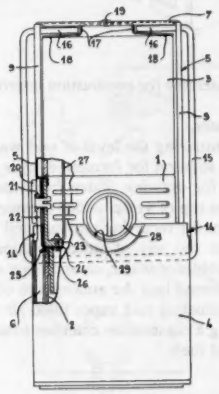
a flow of cooling air through said conduit to provide further cooling of the hot material as it passes therethrough.

4,089,635

PORTABLE GAS LAMPS

Pierre Sivignon, 22, rue Domer, Lyons, France (69007)

Filed Oct. 27, 1976, Ser. No. 736,058
Claims priority, application France, Nov. 4, 1975, 75 34371
Int. Cl.[2] F21L *19/00*
U.S. Cl. 431—111 **8 Claims**



1. A portable gas lamp of the type employing an incandescent mantle, comprising;

a cylindrical base;

a cylindrical glass chimney for surrounding said incandescent mantle, the chimney extending upwardly from the base and being supported thereon;

multiple mutually parallel upright posts secured at their lower ends to the base, the posts extending upwardly from said base parallel to and outside of the glass chimney and having upper ends terminating near the upper end of said glass chimney;

a cylindrical sleeve surrounding the lamp and movable upwardly to a first position wherein it protectively covers the glass chimney, and downwardly to a second lower position wherein it uncovers the glass chimney and surrounds the base;

cooperative sleeve support means carried by said upright posts and said cylindrical sleeve for securing the sleeve to the lamp and for slidingly guiding said sleeve along said posts between said first and second positions; and

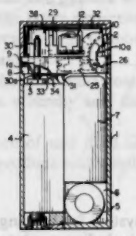
a cover extending horizontally over and spaced from the glass chimney, and means securing the cover to the upper ends of said parallel upright posts.

4,089,636

BATTERY IGNITABLE CIGARETTE LIGHTER

Kenjiro Goto, Urawa, Japan, assignor to Mansei Kogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 539,529, Jan. 8, 1975, abandoned. This application Dec. 15, 1976, Ser. No. 750,709
Claims priority, application Japan, May 20, 1974, 49-57221
Int. Cl.[2] F23Q *2/08*
U.S. Cl. 431—132 **20 Claims**



1. A battery ignitable cigarette lighter comprising:

a casing;

a cap pivotally mounted on said casing;

a fuel tank arranged within said casing for storing fuel gas therein;

a burner nozzle connected to said fuel tank;

a spark gap;

ignition circuit means for generating sparks across said gap;

an insulative housing enclosing said ignition circuit means therein;

switch means arranged to be locked under the control of the pivotal movement of said cap and electrically connected to said ignition circuit means;

support means coupled to said cap and pivotally moveable in accordance with the pivotal movement of said cap for supporting the pivotal movement of said cap, wherein said switch means is positioned such that when said support means is pivotally displaced upon the opening of said cap said switch means is brought into an operable state where said switch means can be actuated to energize said ignition circuit means;

a cell connected through said switch means to said ignition circuit means; and

a cell chamber for receiving said cell therein.

4,089,637

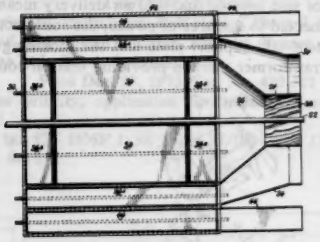
CONTROL OF AIR FLOW IN A BURNER FOR A TANGENTIALLY FIRED BOILER

Donald Arthur Smith, Haddam, Conn., and David Joseph Horan, Westfield, Mass., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed May 20, 1977, Ser. No. 798,967
Int. Cl.[2] F23M *9/08*; F23C *5/18*
U.S. Cl. 431—183 **7 Claims**

1. A furnace having walls that enclose a central combustion chamber, a plurality of burners in said furnace each arrranged to exhaust a fuel and air mixture long a line tangent to a small circle lying in a horizontal plane at the center of the combustion chamber, a source of fuel, nozzle means in the burner directing fuel from said source into the combustion chamber, a windbox associated with said burner including a source of combustion air, duct means connecting the windbox to the furnace, partition means dividing said duct into a plurality of independent passageways for a primary air stream, a secondary

air stream, and a swirler air stream, vanes in the swirler air stream for imparting a rotary movement to air flowing there-



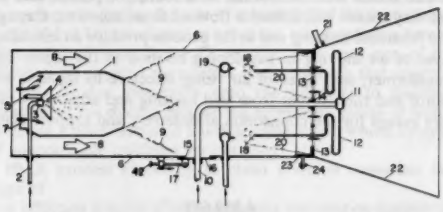
through, and valve means in the passageway for the swirler air stream modulating the flow of air therethrough.

4,089,638

APPARATUS FOR GASSIFICATION, PREMIXING AND COMBUSTION OF LIQUID FUELS

Horacio A. Trucco, 13 Saddler Ct., Huntington Station, N.Y. 11746, and Gerald A. Roffe, 3 Markwood La., East Northport, N.Y. 11731

Filed Jul. 29, 1976, Ser. No. 709,893
Int. Cl.[2] F23D *11/44*
U.S. Cl. 431—209 **8 Claims**



1. A combustion apparatus comprising, in combination, an outer casing, combustion air supply means, liquid fuel supply means, fuel gassification means disposed within the combustion region of the apparatus so as to utilize the heat liberated by combustion to accomplish gassification of the liquid fuel, means to deliver and inject the effluent from said gassification means into a stream of preheated air, a fuel/air premixing duct, flameholder means disposed upstream of said fuel gassification means, means to vary the position of said fuel gassification means relative to said flameholder means, means to preheat the combustion air, ignition means and means to deliver and inject gaseous fuel into the combustion air to start the process.

4,089,639

FUEL-WATER VAPOR PREMIX FOR LOW NOX BURNING

Robert D. Reed, Tulsa, and Eugene C. McGill, Skiatook, both of Okla., assignors to John Zink Company, Tulsa, Okla.

Filed Nov. 26, 1974, Ser. No. 527,196
Int. Cl.[2] F23D *11/44*
U.S. Cl. 431—211 **12 Claims**

1. In a fuel burning system in which gaseous fuel carried within a conduit is mixed with air in a combustion zone, the improvement comprising,

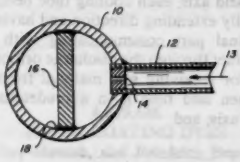
(a) means for adding water as vapor or liquid droplets to said fuel conduit prior to reaching said combustion zone in which said means for adding water droplets comprises;

(b) gas conduit means;

(c) second conduit means entering said gas conduit transversely;

(d) orifice means in said second conduit means, said orifice means co-axial with said second conduit;

(e) means to supply water under pressure to said second conduit means; and



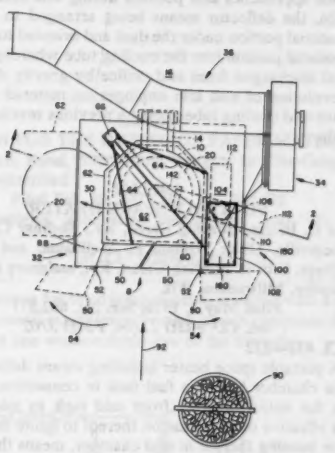
(f) impingement means within the path of said water issuing from said orifice means.

4,089,640

FURNACE HOOD WITH INTEGRAL CONVEYOR FEEDING

Robert C. Overmyer, and Pramodh Nijhawan, both of Indianapolis, Ind., assignors to Hawley Manufacturing Corporation, Indianapolis, Ind.

Filed Nov. 29, 1976, Ser. No. 745,600
Int. Cl.[2] F27D *17/00*
U.S. Cl. 432—73 **16 Claims**



1. For use with a metal-melting furnace provided with an upwardly facing charging opening for insertion of material therethrough, a hood associated with the furnace and overlying the furnace charging opening, the hood including means providing an opening for passage of material therethrough, the improvement comprising conveyor means for feeding material from the hood opening to the furnace opening, the conveyor means being disposed within the hood.

4,089,641

ROTARY KILN WITH CLUSTER OF COOLING TUBES

Gerard Ghestem, Lambersart, France, assignor to Fives-Cail Babcock, Paris, France

Filed Sep. 24, 1976, Ser. No. 726,062
Claims priority, application France, Aug. 25, 1975, 75 26110
Int. Cl.[2] F27D *15/02*
U.S. Cl. 432—80 **10 Claims**

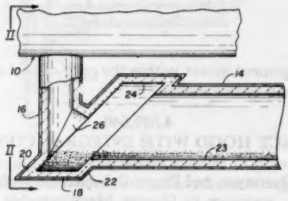
1. A rotary kiln arrangement comprising:

(a) an elongated, tubular kiln having a longitudinal, horizontally extending axis and mounted for continuous rotation about said axis;

(b) a plurality of circumferentially distributed ducts communicating with one axial end portion of said kiln for receiv-

ing hot material processed in said kiln, each duct extending from said end portion in a radially outward direction and having a discharge orifice remote from said kiln;

(c) a plurality of cooling tubes secured to said kiln in circumferentially spaced relationship for movement with said kiln about said axis, each cooling tube being elongated in a horizontally extending direction and having a longitudinally terminal part communicating with a respective, associated duct through the discharge orifice of the associated duct for receiving said material from said duct by gravity when said tube is in a predetermined position below said axis; and



(d) deflector means in each cooling tube for deflecting into said terminal part longitudinally of said tube a portion of the material previously received by said tube when said tube approaches said position during said rotation of the kiln, the deflector means being arranged to retain said material portion under the duct and oriented to thrust said material portion into the cooling tube whereby hot material discharged from said orifice by gravity during each revolution of said kiln impinges on material discharged into said cooling tube during a previous revolution of the kiln.

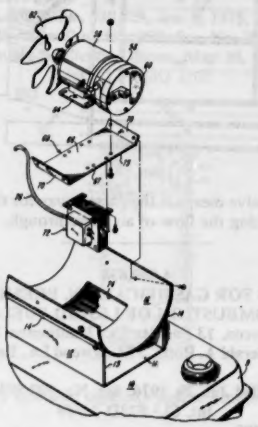
4,089,642

PORTABLE SPACE HEATER

Eugene C. Briggs, Bowling Green, Ky.; Shekhar Chakrawarti, Strongsville, Ohio; William C. Wellbaum, and Robert F. Shaftner, both of Bowling Green, Ky., assignors to Koehring Company, Milwaukee, Wis.

Filed May 3, 1976, Ser. No. 682,577
Int. Cl.[2] F23D *11/04;* F24H *3/02*
U.S. Cl. 432—222 **20 Claims**

1. A portable space heater including means defining a combustion chamber having a fuel tank in connection therewith, means for delivering fuel from said tank to said chamber, means effective on energization thereof to ignite the delivered fuel for burning thereof in said chamber, means the operation of which is effective to deliver air to and about said combustion chamber to support combustion and be heated thereby, means for energizing the ignition means and operating the air delivery means, a housing peripherally encompassing said means defining said combustion chamber and forming therewith a passage for air delivered about said combustion chamber to be heated thereby, said housing having an opening to each of its opposite ends which respectively include an air inlet to and an air outlet from said housing, characterized by a motor and a transformer embodied in said heater, a support plate connected with and extending transversely of said housing in the vicinity of said air inlet, said motor and said transformer being connected to said support plate, said motor being mounted on and over said supported plate and said transformer being dependent from said support plate and clear of said housing wall structure and any underlying structure, generally in line with and to the rear of said combustion chamber, said motor and transformer providing said energizing and operating means for said ignition and said air delivery means when suitably connected to a source of power, the construction and arrangement of said support plate and the mounting of said motor and transformer thereon providing that on connection



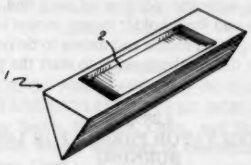
of said motor and transformer to a source of power, said air delivery means will induce a flow of air to move to, through and from said housing and in the process produce an insulating layer of air moving in enveloping relation to the motor and transformer, said layer of air being effective to separate the motor and transformer from said housing and adjacent structure except for the connection afforded by said support plate.

4,089,643

SELF-RESISTANCE-HEATED EVAPORATION BOAT

Charles F. Jerabek, Rye, N.H.; Edward D. Parent, Hamilton, Mass., and Harold W. Smith, Portsmouth, N.H., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Mar. 19, 1976, Ser. No. 668,763
Int. Cl.[2] F27B *14/10*
U.S. Cl. 432—262 **6 Claims**



1. An elongated, cavity-containing, self-resistance-heated, evaporation boat having a triangular cross-sectional shape at its cavity portion, the cross section being taken normal to the long dimension of the boat.

4,089,644

METHOD AND APPARATUS FOR REGULATING THE RATE OF DYE ADSORPTION BY THE NUMBER OF DYE LIQUOR CYCLES

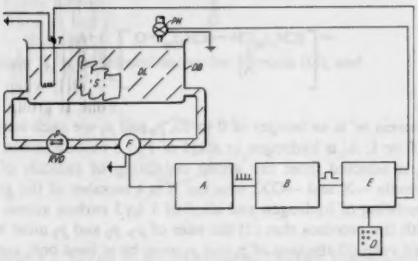
José Carbonell, Bottmingen; Rolf Hasler, Therwil, both of Switzerland, and Roland Walliser, Rixheim, France, assignors to Sandoz Ltd., Basel, Switzerland

Filed Dec. 10, 1973, Ser. No. 423,311

Claims priority, application Switzerland, Apr. 13, 1973, 5330/73

Int. Cl.[2] D06P *1/38;* D06F *33/00;* G07F *13/00*

U.S. Cl. 8—1 R 14 Claims



1. In a process of exhaust dyeing a substrate in a dyebath wherein dye liquor is caused to be recycled relatively through the substrate, the improvement to obtain a level dyeing which comprises monitoring the rate of exhaustion of the dyebath per cycle of dye liquor relative to substrate, said rate being hereinafter referred to as factor D, regulating at least one of the chemical or physical parameters of the dyebath that controls the rate of dye absorption onto the substrate to maintain throughout the dyeing process the monitored values of factor D below a predetermined limiting value above which dyeings of unacceptable levelness are obtained.

10. A process according to claim 1 which comprises the steps of

a. effecting a series of exhaust dyeing test runs on samples of the structure to be dyed at different and constant values of the factor D by monitoring the value of factor D in each test run and accordingly regulating at least one of the control parameters that control the rate of adsorption of dye onto the substrate samples to obtain a constant value of factor D in each test run which is different from the value in the other test runs and determining from the dyeing samples produced a value of factor D below the limiting value that results in an acceptably level dyeing, and

b. effecting an exhaust dyeing production process characterized by monitoring the value of factor D and accordingly regulating at least one of the control parameters to prevent the value of D from exceeding the predetermined value.

4,089,645

PROCESS FOR DYEING POLYMER SUBSTRATES

Vernon P. Simpson, Lewiston, and Alma L. Coats, Grand Island, both of N.Y., assignors to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.

Continuation of Ser. No. 550,304, Feb. 18, 1975, abandoned, which is a continuation-in-part of Ser. No. 367,914, Jun. 7, 1973, abandoned. This application Aug. 27, 1976, Ser. No. 718,261

Int. Cl.[2] D06P *1/673, 5/22*

U.S. Cl. 8—4 22 Claims

1. The process of dyeing polymer substrates which comprises the steps of

(a) treating a polymer substrate with a low oxidation state phosphorus sulfide from the group consisting of phosphorus resquisulfide, tetraphosphorus pentasulfide and tetraphosphorus hept a sulfide to deposit at the surface of said substrate a coating of said low oxidation state phosphorus sulfide, and

(b) dyeing the thus treated polymer substrate by contacting it with an aqueous liquor comprising a basic organic dyestuff.

4,089,646

PAPER COATING DYES

Peter Habereder, Munich, and Friedrich Bayerlein, Krailing, both of Germany, assignors to Diamalt Aktiengesellschaft, Munich, Germany

Filed Mar. 9, 1976, Ser. No. 665,316

Int. Cl.[2] D21H *1/46*

U.S. Cl. 8—7 2 Claims

1. A paper coating dye composition of the type containing white pigments, binding agents for said pigments and a water retention agent, comprising 0.1 – 5% of a carboxymethyl ether of seed flour as the water retention agent, said carboxymethyl ether being subjected to oxidative, or hydrolytic and oxidative treatment prior to, or subsequent to the etherification, and which has a viscosity of 250 – 4,000 cP measured at 20° C on a Brookfield viscosimeter in a concentration of 4% in cold water.

4,089,647

PROCESS FOR THE DYEING OF PAPER MATERIAL

Peter Mockli, Basel, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

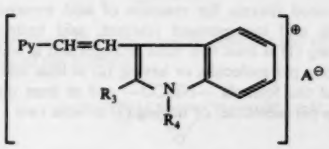
Filed Feb. 10, 1977, Ser. No. 767,591

Claims priority, application Switzerland, Mar. 18, 1976, 3405/76

Int. Cl.[2] D21H *1/46*

U.S. Cl. 8—7 13 Claims

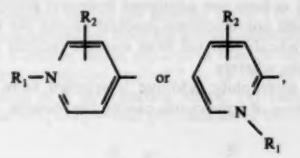
1. In a process for the dyeing of paper material with a dye in an aqueous medium, the improvement which comprises dyeing with at least one water-soluble dye of the formula



(I)

wherein

Py represents a pyridyl group of the formula



R_1 represents lower alkyl; lower alkyl substituted by chloro, hydroxy or cyano; allyl; or benzyl;

R_2 represents hydrogen, halogen, methyl or ethyl;

R_3 represents hydrogen, methyl, ethyl or phenyl;

R_4 represents hydrogen, lower alkyl; lower alkyl substituted by chloro, hydroxy or cyano; or allyl; and

$A^{\ominus}$ represents an anion.

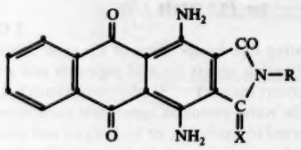
4,089,648

PROCESS FOR DRY DYEING SYNTHETIC OR SEMI-SYNTHETIC, OR NATURAL MATERIALS

Taizo Ohshima, Tondabayashi; Masao Nishikuri, Hirakata; Yasuyuki Suzuki, and Kunio Yamada, both of Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Filed Apr. 7, 1977, Ser. No. 785,602
Claims priority, application Japan, Apr. 15, 1976, 51-43451
Int. Cl.[2] C09B *1/00*; C09D *11/00*
U.S. Cl. 8—39 R **7 Claims**

1. A dry dyeing ink composition comprising a coloring agent vaporizable upon application of heat and a binding agent, characterized by using as the coloring agent a dye of the formula,



wherein X is an oxygen atom or NH group, and R is a C_4 or C_5 alkyl or C_4 or C_5 alkenyl group.

4,089,649

COMPOSITIONS AND PROCESS FOR FIBER MODIFICATION

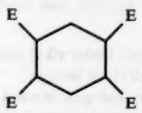
Frank Mares, Whippany, and Theodore Largman, Morristown, both of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Mar. 4, 1976, Ser. No. 663,871
Int. Cl.[2] D06M *13/20, 13/40, 13/42*
U.S. Cl. 8—115.5 **17 Claims**

1. A process of treating a fibrous article prepared from fiber-forming thermoplastic resin, to improve hydrophilic properties, which comprises contacting the fibrous article in liquid organic or aqueous medium with at least one hydrophilic additive, at least one polyfunctional reactant and at least one nitrogen catalyst under conditions sufficient to incorporate additive, reactant and catalyst into the fibrous article; and heating the fibrous article having additive, reactant and catalyst incorporated therein for reaction of said incorporated additive with said incorporated reactant, said hydrophilic additive having (1) at least two ether linkages and at least one hydroxyl group per molecule, or having (2) at least one divalent group of the formula —NHCO— and at least one hydroxyl group per molecule, or having (3) at least two

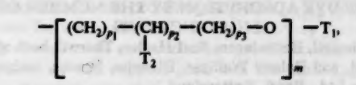
groups and at least one additional hydroxyl group per molecule; and said polyfunctional reactant having per molecule at least two radicals selected from epoxide radicals and isocyanate radicals; wherein

(I) said hydrophilic additive is selected from the group consisting of compounds having the formula

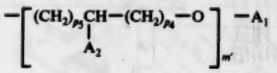


(A)

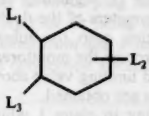
wherein two E groups are E_1, and two E groups are E_2, wherein (i) E_1 is $—CON(R_1)_2$ or $—CO_2R_1$, wherein R_1 is a monovalent radical of the formula



wherein m is an integer of from 0 to 10; p_1, p_2 and p_3 are each integers of 0 or 1; T_2 is selected from the group consisting of hydrogen, —OH, T_1 and OT_1; and T_1 is in each occurrence independently selected from the group consisting of radicals of the formula

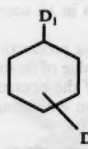


wherein m' is an integer of 0 to 10, p_4 and p_5 are each integers of 0 or 1, A_1 is hydrogen or alkyl of 1 to 3 carbon atoms, and A_2 is selected from the group consisting of radicals of the formula —X and —OX, wherein X is a member of the group consisting of hydrogen and alkyl of 1 to 3 carbon atoms; and with the provisos that (1) the sum of p_1, p_2 and p_3 must be at least two; (2) the sum of p_4 and p_5 must be at least one; and (3) the sum of m plus m' must be at least two; (ii) E_2 is $—CO_2H$ or $—CO_2(CH_2)_{x_1}(CHOH)_{x_2}CH_2Q$, in which x_1 and x_2 are each integers of 0 or 1, and Q is hydrogen or —OH; when Q is —OH, x_1 must be 1; and wherein at least one E group must contain at least one —OH group;



(B)

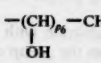
wherein L_1, L_2 and L_3 are independently selected from the group consisting of $—CO_2H$, $—CON(R_1)_2$, $—CO_2(CH_2)_{x_1}(-CHOH)_{x_2}CH_2Q$ and $—CO_2R_1$, wherein R_1 is as defined above for E_1 of formula (A) and x_1, x_2 and Q are as defined above for E_2 of formula (A); with the provisos that at least one of L_1, L_2 and L_3 must contain at least one —OH group and at least one of L_1, L_2 and L_3 must be $—CO_2R_1$;



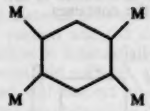
(C)

wherein D_1 and D_2 are the same or different and are independently selected from the group consisting of $—O_2CR_2$ and

wherein R_2 is a monovalent radical having the formula

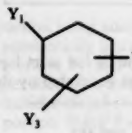


wherein p_6 is an integer of 2 to 4;


(D)

wherein two M groups are M_1 and two M groups are M_2, wherein M_1 and M_2 are monovalent radicals independently selected from the group consisting of $-O_2CR_2$ and

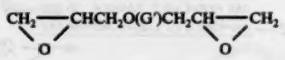
wherein R_2 is as defined above for formula (C); and


(E)

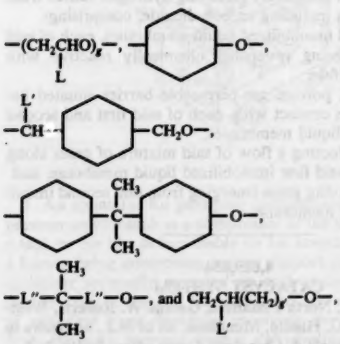
wherein Y_1, Y_2 and Y_3 are monovalent radicals independently selected from the group consisting of $-O_2CR_2$ and

wherein R_2 is as defined above for formula (C); and wherein

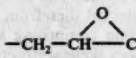
(IIa) Said polyfunctional reactant is selected from the group consisting of epoxides of formula


(A')

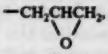
wherein (i) G' is selected from the group consisting of



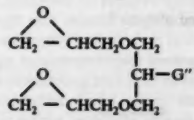
wherein g is an integer of 1 to 10, g' is an integer of 1 to 4, (ii) L is selected from the group consisting of hydrogen, alkyl radicals of 1 to 5 carbon atoms, aryl radicals, $-CH_2OH$, $-CH_2Cl$ or



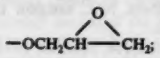
(iii) L' is selected from the group consisting of hydrogen, alkyl radicals of 1 to 5 carbon atoms, $-CH_2CH(OH)CH_2OH$ and

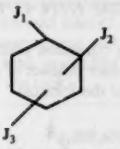


and (iv) L'' is a saturated cycloalkyl radical of 5 to 6 carbon atoms;

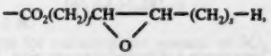

(B')

wherein G'' is $-OH$, $-OCH_2CH(OH)CH_2OH$ or

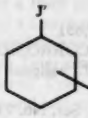



(C')

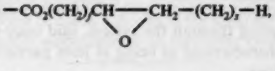
wherein J_1, J_2 and J_3 are independently selected from the group consisting of $-CO_2R_1$ and



wherein f is an integer of 1 to 6 and s is an integer of 0 to 3 and R_1 is as defined above for E_1 of formula (IA); and


(D')

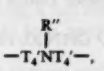
wherein J' and J'' are the same or different and are monovalent radicals of the formula



wherein f and s are as defined above for formula (C'); or

(IIb) Said polyfunctional reactant is selected from the group consisting of

(A'') isocyanates having the formula $T_3(NCO)_2$ in which T_3 is a diradical selected from the group consisting of (i) alkyl of 2 to 8 carbon atoms, (ii) aryl of 6 to 10 carbon atoms, (iii) alkyl-substituted aryl of 7 to 14 carbon atoms, (iv) cycloalkyl of 3 to 8 carbon atoms, (v) radicals of the formula $-T_4'OT_4'-$ and (vi) radicals of the formula



wherein T_4' is divalent alkyl of 2 to 8 carbon atoms or divalent aryl, and R'' is monovalent alkyl of 1 to 3 carbon atoms, and;

(B'') isocyanates having the formula $T_4(NCO)_3$, wherein T_4 is a triradical selected from the group consisting of (i) alkyl of 3 to 8 carbon atoms, (ii) aryl of 6 to 10 carbon

atoms, (iii) alkyl-substituted aryl of 7 to 14 carbon atoms, (iv) cycloalkyl of 3 to 8 carbon atoms, and (v) radicals of the formula

$$-T_4'NT_4'-,$$
$$\quad\quad|$$
$$\quad T_4'-$$

wherein T_4' is as defined above.

4,089,650

USE OF DIELS-ALDER ADDUCTS OF DIHYDRO-NITROGEN HETEROCYCLIC PHOSPHORAMIDATES AS CORROSION INHIBITORS

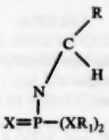
Derek Redmore, Ballwin, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Division of Ser. No. 452,644, Mar. 19, 1974, Pat. No. 3,965,264, which is a division of Ser. No. 210,106, Dec. 20, 1971, Pat. No. 3,821,232. This application Mar. 15, 1976, Ser. No. 666,941

Int. Cl.² C23F *11/14, 11/16*

U.S. Cl. 21—2.7 A **10 Claims**

1. A process of inhibiting corrosion which comprises treating a system with a Diels-Alder Adduct of a dihydro-nitrogen heterocyclic phosphonate of the formula



where N - C represents a dihydronitrogen ring, R and R_1 are lower alkyl or phenyl groups and X is O or S.

4,089,651

PYROPHOSPHATE-ZINC CORROSION INHIBITOR

James E. Scott, LaHabra, Calif., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Aug. 4, 1976, Ser. No. 711,756

Int. Cl.² C23F *11/18, 11/16*

U.S. Cl. 21—2.7 R **5 Claims**

1. A method for inhibiting metal corrosion in once-through water systems comprising maintaining a level of 0.1–20 ppm by weight of pyrophosphate and 0.01–10 ppm by weight of zinc in the water passing through the system, said once-through systems being characterized as being at least partially composed of copper alloys.

4,089,652

DETECTION OF WATER IN OIL

August Bartold Pedersen, Llanover Cottage, Ockham Road South, East Horsley, Surrey, England

Filed May 12, 1977, Ser. No. 796,107

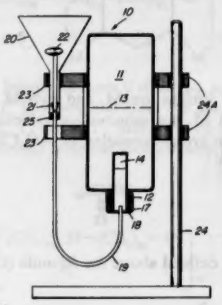
Claims priority, application United Kingdom, May 12, 1976, 19538/76

Int. Cl.² G01N *33/18, 33/22*

U.S. Cl. 23—230 HC **5 Claims**

1. A method of detecting water in a sample of oil, which comprises:

i. bringing the sample of oil into contact with reagent means chemically inert to the oil and reactive with water to produce gas, the reagent means being present in a quantity of an inert liquid miscible with the oil and contained in container fitted with a manometer tube communicating with the interior of the container,



ii. determining the volume of the inert liquid driven out of the container by the gas generated by the reagent means.

4,089,653

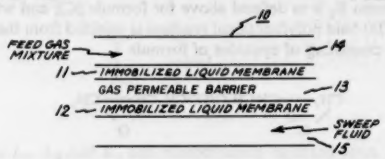
APPARATUS FOR THE SEPARATION OF HYDROGEN SULFIDE FROM GAS MIXTURE INCLUDING CARBON DIOXIDE

William J. Ward, III, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jul. 28, 1975, Ser. No. 599,871

Int. Cl.² B01J *1/22*; C01B *17/16, 31/20*

U.S. Cl. 23—284 **4 Claims**



1. Apparatus for selectively removing hydrogen sulfide from a mixture of gases including carbon dioxide, comprising:

first and second immobilized liquid membranes, each of said membranes being reversibly chemically reactive with hydrogen sulfide;

a hydrophobic, porous, gas-permeable barrier situated between, and in contact with, each of said first and second immobilized liquid membranes;

means for conducting a flow of said mixture of gases along a surface of said first immobilized liquid membrane; and

means for removing gases emerging from said second immobilized liquid membrane.

4,089,654

CATALYST SYSTEM

Leon M. Polinski, North Plainfield; George W. Roberts, Westfield, and Saul G. Hindin, Mendham, all of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Iselin, N.J.

Filed Aug. 26, 1975, Ser. No. 607,775

Int. Cl.² F01N *3/15*

U.S. Cl. 23—288 FC **18 Claims**

1. A catalyst system comprising

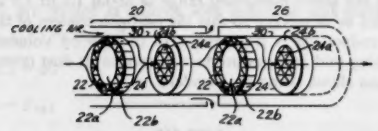
a catalyst configuration consisting of at least a downstream honeycomb catalyst portion and an upstream honeycomb catalyst portion protected therefrom,

each honeycomb portion comprising as support a porous unitary solid refractory skeletal structure having upstream and downstream faces and having a plurality of unobstructed gas flow channels extending therethrough,

means to secure said upstream and downstream portions

substantially free of continuous thermal conduction paths through solid material between the upstream face of said downstream portion and the downstream face of said upstream portion to substantially minimize thermal conduction between said portions, and

means positioned with respect to said upstream and downstream portions to substantially reduce radiant heat transfer from said downstream portion to said protected upstream portion,



said upstream portion being adapted and allowed to operate at relatively substantially lower temperatures than is said downstream portion by said means to minimize thermal conduction therebetween and by said means to reduce radiant heat transfer therebetween;

said upstream portion being formulated to have a higher catalytic activity than does said downstream portion but to be thermally-less-stable if heated substantially above said relatively lower temperatures.

4,089,655

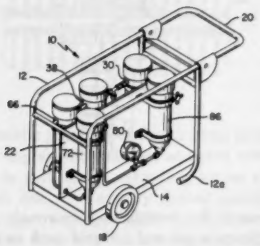
AIR PURIFICATION SYSTEM

John J. Razete, Cincinnati, Ohio, assignor to Aero-Dri Corporation, Cincinnati, Ohio

Continuation of Ser. No. 657,569, Feb. 12, 1976, abandoned, which is a continuation of Ser. No. 389,575, Aug. 20, 1973, abandoned. This application Oct. 20, 1976, Ser. No. 734,092

Int. Cl.[2] B01J *8/02, 8/04;* **A61L** *9/06*

U.S. Cl. 23—288 F **8 Claims**



1. An apparatus for purifying contaminated air from a high pressure source such as a compressor or the like for delivery to a tank or the like as breathable air for breathing or the like by a human being comprising carrier support means; a first stage container securedly mounted on said carrier support means; said first stage container having an inlet and an outlet; said inlet of said first stage container receiving the contaminated air from the high pressure source; dehydrating means disposed within said first stage container to remove moisture from the air passing through said first stage container so that the moisture level of the air is at a predetermined dew point when passing through said outlet of said first stage container; a second stage container securedly mounted on said carrier support means; said second stage container having an inlet and an outlet; first means connecting said outlet of said first stage container and said inlet of said second stage container; bleed means connected to said first connecting means to bleed off a portion of the air passing through said first connecting means, said bleed means including a shut-off valve connected to said first connecting means, a flow limiter connected to said shut-off valve, indicating means to provide an indication of the moisture level of the air passing through said first connecting means and connected to said flow limiter, said flow limiter limiting the pressure in said indicating means, a safety valve connected between said flow limiter and said indicating means to prevent excessive pressure build up in said indicating means, and a bleed valve connected with said indicating means to permit bleed off of air therein; means disposed within said second stage container to remove hydrocarbons from the air passing through said second stage container; third stage container means securedly mounted on said carrier support means; said third stage container means having an inlet and an outlet; second means connecting said inlet of said third stage container means with said outlet of said second stage container; said third stage container means including at least one container; catalyst material means disposed within said third stage container means to convert carbon monoxide in the air passing through said third stage container means to carbon dioxide; a fourth stage container securedly mounted on said carrier support means; said fourth stage container having an inlet and an outlet; means disposed within said fourth stage container to remove odors from the air passing through said fourth stage container; third means connecting said outlet of said third stage container means with said inlet of said fourth stage container; and fourth means connecting said outlet of said fourth stage container with the tank or the like to which the purified air is supplied to charge the tank.

4,089,656

TREATMENT OF SOLID FUELS

Edward L. Cole, Fishkill, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed Aug. 23, 1976, Ser. No. 716,499

Int. Cl.[2] C10L *9/10*

U.S. Cl. 44—1 R **9 Claims**

1. A process for reducing the amount of SO_2 produced by the combustion of a low rank solid fuel which comprises separating said fuel into a first portion having a particle size smaller than a 10 mesh Tyler sieve and a second portion having a particle size greater than a 10 mesh Tyler sieve, separating said second portion into a third portion having a specific gravity below about 1.5 and a fourth portion having a specific gravity above about 1.5, grinding said third portion to a particle size smaller than 10 mesh Tyler sieve, screening said first portion to provide a 10–48 mesh Tyler sieve portion, combining said 10–48 mesh portion and said ground third portion and subjecting the resulting mixture to hydrothermal treatment at a temperature between 300° and 590° F. in a non-oxidizing atmosphere under autogenous pressure.

6. The process of claim 1 in which the separation is made by means of a water suspension of an organic compound.

7. The process of claim 1 in which the separation is made by means of a water suspension of an inorganic compound.

4,089,657

STABILIZED SUSPENSION OF CARBON IN HYDROCARBON FUEL AND METHOD OF PREPARATION

Leonard James Keller, Dallas, Tex., assignor to The Keller Corporation, Dallas, Tex.

Filed May 16, 1977, Ser. No. 797,414

Int. Cl.[2] C10L *1/32*

U.S. Cl. 44—51 **13 Claims**

1. A method of preparing a fuel comprising the steps of:

a. comminuting coal to form particles of a predetermined size range;

b. coating at least the exposed surfaces of said particles of said coal with an alcohol selected from the class consisting of methanol, ethanol, propanol, butanol and mixtures thereof to form alcohol coated carbon particles;

c. admixing said alcohol coated coal particles with a liquid hydrocarbon to form a substantially uniform admixture thereof and form a fuel that can be readily transported by

hydraulic transport and the like to a using destination and burned with exceptionally high efficiency.

8. A fuel composition comprising a substantially uniform admixture of a liquid phase comprising liquid hydrocarbon and coal particles of −8 mesh particle size with a majority being of −100 mesh particles size; said coal particles having at least sufficient alcohol to coat the surface thereof; said alcohol having 1–4 carbon atoms, inclusive.

4,089,658

COAL EXTRACTION AND FUEL ADDITIVE MADE THEREFROM

Eugene Howard Bay, Panama City Beach, Fla., assignor to B.D.F. Ltd., Lanham, Md.

Filed Sep. 8, 1976, Ser. No. 721,300
Int. Cl.² C10L *1/26*
U.S. Cl. 44—56 **4 Claims**

1. Process of extracting coal which comprises admixing coal, water, petroleum naphtha and carbon tetrachloride, wherein for each pound of coal from 5 to 50 pounds of water are used, and wherein for each 100 parts by volume of water from 2 to 20 parts of petroleum naphtha and from 0.25 to 10 parts by volume of carbon tetrachloride are used, and separating petroleum naphtha containing from about 0.5 to 30 weight percent coal extract from the remaining components.

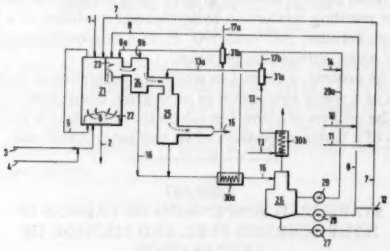
4. A gasoline additive composition containing, in parts by volume, from 30 to 50 parts of a petroleum naphtha boiling in the range of from about 200° F to 300° F, from 15 to 25 parts of ortho-dichlorobenzene, from 2 to 10 parts of tricresylphosphate, from 2 to 10 parts of isopropyl alcohol, and from 0.2 to 2 parts of the organic solvent containing coal extract prepared by the process of claim 1.

4,089,659

PROCESS FOR PRODUCING A LEAN GAS BY THE GASIFICATION OF A FUEL MAINLY IN LUMP FORM

Gerhard Baron, Hofheim; Paul Rudolph, Bad Homburg; Rudolf Kohlen, Wehrheim, and Carl Hafke, Frankfurt am Main, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 24, 1977, Ser. No. 771,724
Claims priority, application Germany, Feb. 26, 1976, 2607744
Int. Cl.² C10J *1/06*
U.S. Cl. 48—197 R **20 Claims**



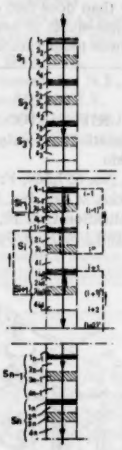
1. In a process for producing lean gases in which coal in the presence of mineral constituents is gasified in a reaction chamber under super-atmosphereric pressure of about 5–150 bars by a treatment with a gasifying agent containing air and water vapor, the improvement which comprises: supplying the coal plus mineral constituents and gasifying agent so as to flow in opposite directions, supporting the fuel on a grate, adding about 1.5 to 3.5 kg of water vapor per standard m^3 of free oxygen in the gasifying agent, about 70% of the coal to be gasified having a particle size from above about 2 mm to about 30 mm and the remaining coal having a particle size below about 2 mm, the ballast content of water and ash amounting to at least about 15% by weight, most of the mineral constituents having a particle size of about 2 to 30 mm, withdrawing the ash which becomes available in the gasification process from the lower portion of the reactor chamber at a temperature above about 250° C, withdrawing raw gas at temperatures above about 350° C, cooling the reactor chamber with water in a water-cooled, double-walled jacket thereby generating steam from the cooling water, cooling the grate with such steam and supplying such steam to said chamber as part of the gasifying agent, adjusting the rate at which steam consisting of extraneous steam and jacket steam is added to the gasifying agent within the above-mentioned range of about 1.5 to 3.5 kg per standard m^3 of oxygen so that the nitrogen content of the dry raw product gas is from about 25 to 50% by volume, and scrubbing said raw gas product to reduce its dust content to less than about 10 mg per standard m^3.

4,089,660

PROCESS FOR CONTACTING A GAS WITH A LIQUID

Jacques Sterlini, Paris, France, assignor to Compagnie Electro-Mecanique, Paris, France

Continuation of Ser. No. 615,107, Sep. 10, 1975, abandoned. This application Dec. 29, 1976, Ser. No. 755,198
Claims priority, application France, Aug. 27, 1974, 74 29309
Int. Cl.² B01F *3/04*
U.S. Cl. 55—93 **5 Claims**



1. A process for establishing thorough and methodical contact between a gas and a liquid such as in particular are likely to react with each other, said process involving changes in the gas and in the liquid in sequences, each sequence comprising the following stages:

(a) emulsifying, at a given pressure p, a flow of gas and a flow of liquid,

(b) expanding the resulting mixture to a pressure p′ thereby accelerating the same,

(c) separating the gas from the liquid at pressure p′,

(d) recompressing liquid with deceleration of the same, the expansion work of the gas being thereby transferred to the liquid,

the liquid and the gas being made to circulate in two circuits on the whole in opposite directions in a plurality of sequences $S_1 \ldots S_{i-1}$, S_i, $S_{i+1} \ldots S_n$, the liquid being introduced in sequence S_1 and the gas in sequence S_n, and the liquid being expelled from the end of stage (d) of sequence S_i into stage (a) of next sequence S_{i+1} at a higher pressure and higher total energy than the pressure and energy at the inlet of stage (a) of sequence S_i and the gas separated from the liquid in stage (c) of sequence S_{i+1} being introduced in stage (a) of sequence S_i at the same pressure as the pressure of the liquid and said gas introduced at stage (a)

of sequence S_i moving in the same direction as the liquid introduced at stage (a) of sequence Si, the liquid being expelled from the last sequence S_n at a pressure higher than the pressure of the gas introduced in said sequence and the gas being expelled from the first sequence S_1 at a pressure lower than the pressure of the liquid introduced in said first sequence,

the process being further characterized in that the pressures $p_1 \ldots p_i \ldots p_n$ of the liquid and the pressures $p'_1 \ldots p'_i \ldots p'_n$ of the gas at the exit of each of sequences $S_1 \ldots S_i \ldots S_n$ are related as follows with regard to unit sequences $S_{i-1} \ldots S_i, S_{i+1}, S_{i+2}$

$$p_{i-1} = p'_i$$

$$p_i = p'_{i+1}$$

$$p_{i+1} = p'_{i+2}$$

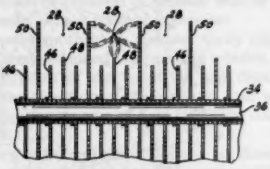
and so forth, thereby promoting a stepwise transfer of the energy of the gas into the liquid.

4,089,661

TWO STAGE ELECTROSTATIC PRECIPITATOR

Jimmy L. Milum, Harrison, Ark., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Jan. 12, 1977, Ser. No. 758,610
Int. Cl.² B03C *3/08*
U.S. Cl. 55—137 **3 Claims**



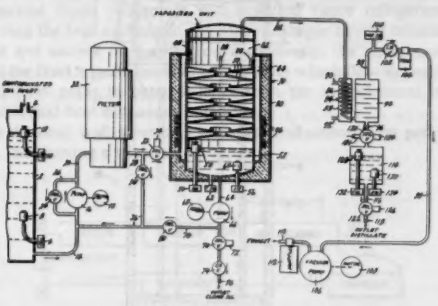
1. In an electrostatic precipitator for cleaning an air stream, a metal casing having an inlet side and an outlet side, a length of ionizing wire in said casing extending across said casing adjacent said inlet side, five equally spaced metal collector plates in said casing arranged parallel with said wire and extending downstream from said wire to a point adjacent said outlet side of said casing, the outermost two of said plates being equally spaced on opposite sides of said wire and having portions thereof extending upstream toward said inlet side beyond said wire, the central one of said plates being in alignment with said wire and having its upstream edge spaced downstream from said wire a distance substantially equal to the distance from said wire to the surfaces of said upstream extended portions of said outermost plates, the remaining two of said plates having their upstream edges spaced downstream from the upstream edge of said central plate, means grounding said outermost two plates and said central plate at the same potential, means electrically insulating said wire and said remaining two plates from said two outermost plates and said central plate, and means electrically connecting said wire and said remaining two plates to the positive side of a D.C. power source to provide ionizing fields extending between said wire and said two outermost plates and between said wire and said central plate and for creating electrostatic fields between the surfaces of said remaining two plates and said outermost plates and between said remaining two plates and said central plate.

4,089,662

OIL TREATMENT SYSTEM

Marvin R. Williams, Springfield, Mo., assignor to Allen Filters, Inc., Springfield, Mo.

Filed Jun. 22, 1977, Ser. No. 808,896
Int. Cl.² B01D *1/22*
U.S. Cl. 55—166 **10 Claims**



1. An oil treatment system including:
a. an oil vaporizer unit including a sealed housing,
b. delivery means operable to deliver contaminated oil having water, dissolved gases and/or volatile contaminants contained therein to said vaporizer housing,
c. heater means operable to heat said oil within said housing, whereby said water, gases and volatile contaminants are driven from said oil in gaseous form,
d. vacuum means operable to create a vacuum within said housing to assist in the removal of said contaminants from said oil and to draw off the gaseous contaminants driven from said oil,
e. exhaust means operable to draw the treated oil from said housing to an outlet,
f. diversion means operable when activated to divert the exhausted oil from said outlet and back to the inlet of said housing, and
g. temperature-sensitive control means operable to deactivate said diversion means only when the temperature of the oil leaving said housing has been elevated to a sufficiently high temperature to insure substantially complete removal of all water, dissolved gases and volatile contaminants therefrom.

4,089,663

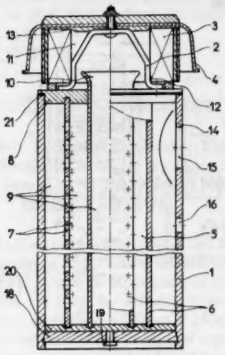
PULSATION AND NOISE SUPPRESSOR ASSEMBLY WITH AIR FILTER

Stanislaw Kulig; Andrzej Góral; Wlodzimierz Surkow; Andrzej Szczepanik, and Edward Szulaczewski, all of Cracow, Poland, assignors to Cebea Osrodek Badawczo-Rozwojowy Przemyslu Budowy Urzadzen Chemicznych, Cracow, Poland

Filed Apr. 14, 1976, Ser. No. 676,973
Claims priority, application Poland, Apr. 19, 1975, 179782
Int. Cl.² B01D *46/00*
U.S. Cl. 55—276 **8 Claims**

1. A pulsation and noise suppressor apparatus having an air filter provided with air intake and outlet means, said apparatus being used with an induction system of thermodynamic engines, especially that of compressors, containing a noise and a pulsation suppression chamber with a precleaning filter wrapped in a layer of filter fibre material, said apparatus including: a housing formed of flexible non-metallic material provided with a suction outlet formed therewith, a bracket means for affixing the filter and its casing to a replaceable suppression cartridge means located inside the housing; face walls disposed at opposite ends thereof for closing said housing, said cartridge being formed of non-metallic material defined by a plurality of tubes one within the other in said hous-

ing each having holes associated therewith, which connect an inner space of said respective tubes to that outside of said tubes, said tubes being respectively further defined by said face walls and being eccentrically arranged with respect to each other to form at least two chambers for the suppression of pulsation and noise, the inner of said tubes projecting through a face wall



adjacent the filter and its casing each of said tubes having a wall thickness proportional to the tube diameter, and the volume of each chamber being larger than that of an adjacent chamber; the cross-sectional area of the holes in the walls of tubes being proportional to the diameter of the tubes, and diffuser means affixed to the face wall, for connecting the suppression chamber to the inner space of said filter.

4,089,664

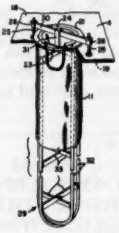
BAG HOLDER FOR SELF-CLEANING BAG FILTER

Richard D. Noland, Overland Park, Mo., assignor to Air-O-Matics, Inc., Kansas City, Mo.

Filed Mar. 1, 1976, Ser. No. 662,570

Int. Cl.² B01D *46/02*

U.S. Cl. 55—341 R **5 Claims**



1. In a bag filter device having a housing with a partition therein forming a filter chamber and a separate plenum chamber, said partition having a plurality of openings with an elongated filter bag mounted at each opening, each of said filter bags extending through one of said partition openings into said filter chamber, said filter chamber receiving air for filtration from an inlet and communicating said air through said filter bags and partition openings to said plenum chamber for discharge through an outlet, said filter bags entrapping solids suspended in said air, each filter bag having a closed end and an open end with a cuff at said open end, the improvement in bag mounting structure comprising:

(a) a stationary shoulder on the plenum chamber side of said partition in surrounding relation to each of the openings therein;

(b) each shoulder having associated therewith a clamping ring engaging one of said filter bag cuffs and sealing same against said shoulder;

(c) each clamping ring having a hanger member secured thereto and extending thereacross, said hanger member being adapted as a handle;

(d) an elongated bag supporting frame within each of said filter bags and having a transverse dimension less than the transverse dimension of said partition openings;

(e) a disengageable connector projecting upwardly from each of said supporting frames and engaging a respective hanger member thereby suspending said frame and a filter bag thereon from said hanger member and permitting said frame and bag to be selectively withdrawn downwardly by disengagement from said hanger member or withdrawn upwardly through the associated partition opening;

(f) each hanger member having extensions thereof projecting outwardly past the perimeter of the associated clamping ring, each extension having a seating device thereon; and

(g) seating members on the plenum chamber side of said partition, each seating member being located for co-operation with a respective hanger member extension seating device and positively aligning a clamping ring for seating with a respective shoulder and clamping a filter bag cuff therebetween.

4,089,665

DEFLECTING MEANS

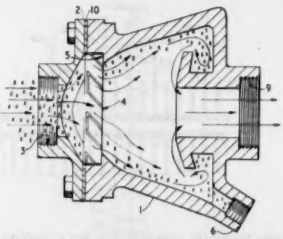
Donald Brookman, Helsby, England, assignor to Burvell Canada Company Limited, Toronto, Canada

Filed Jan. 5, 1977, Ser. No. 756,835

Claims priority, application United Kingdom, Sep. 4, 1976, 36735/76

Int. Cl.² B01D *45/16*

U.S. Cl. 55—457 **8 Claims**



1. A centrifugal separator for removal of impurities from gases, comprising:

a. a housing having a pair of opposite end walls forming a chamber therein;

b. an air inlet in one of said end walls, and an air outlet in the other of said end walls;

c. a drain outlet for impurities in said housing adjacent said air outlet;

d. deflecting means positioned in said housing adjacent said inlet and wherein the portion of the housing between said deflecting means and said outlet from the major portion of the housing;

e. said deflecting means comprising:

1. a central substantially circular body having a convex surface thereon forming a dome extending towards said inlet for improving gas flow characteristics;

2. a plurality of vane means extending from the periphery of said body and having portions bent to extend into the major portion of said chamber toward said outlet for deflecting gases passed thereover and creating a vortex flow in said housing;

3. means for securing said deflecting means, including said vanes in seating means in said housing;

4. a cylindrical guide sleeve affixed to said central body extending into the major portion of said chamber, said

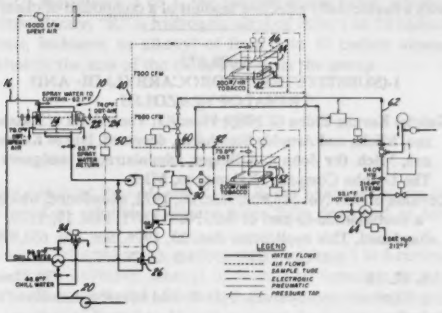
sleeve being positioned substantially at the radially inner edges of said vanes and coaxial with said central body whereby additional guidance of gas flowing over the vanes is provided.

4,089,666

METHOD FOR CONTROL OF AIR RELATIVE HUMIDITY WITH REDUCED ENERGY USAGE

Jack B. Knight, Richmond, Va., assignor to Philip Morris Incorporated, Richmond, Va.

Filed Jun. 25, 1976, Ser. No. 699,880
Int. Cl.² F25D 17/06
U.S. Cl. 62—91 **3 Claims**



1. A method for reestablishing desired predetermined dry bulb temperature and relative humidity values in a spent air conditioning flow stream which has been subjected to a use resulting in addition or removal of sensible and/or latent heat to said flow stream, which method comprises

passing the spent air through a water spray curtain maintained at a predetermined temperature relative to the dew point temperature of the spent air and disposed transversely of the direction of the air flow, said water spray curtain presenting an area of heat exchange confrontation to said flow,

sensing the dry bulb temperature of the air downstream of the spray curtain and varying the spray curtain area responsive to variations of the sensed dry bulb temperature from said desired predetermined value thereby to correspondingly control the quantity of heat exchange effected to the air in said spray curtain,

sensing the dew point temperature of the air downstream of the spray curtain and controlling the temperature of the water supplied to said spray curtain responsive to variations of the sensed dew point temperature from a predetermined value thereby to control the dew point temperature of the air at said predetermined value whereby the air leaving said spray curtain is at said desired relative humidity value, and

returning the thus treated air to a point of use.

4,089,667

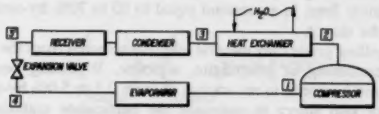
HEAT EXTRACTION OR RECLAMATION APPARATUS FOR REFRIGERATING AND AIR CONDITIONING SYSTEMS

Kjartan A. Jonsson, Ballston Lake, N.Y., assignor to Sun-Econ, Inc., Ballston Lake, N.Y.

Filed Oct. 27, 1976, Ser. No. 736,004
Int. Cl.² F25B 27/02
U.S. Cl. 62—238 **8 Claims**

1. In heat reclamation apparatus for connection to a conventional refrigeration or air conditioning system having a compressor, a condenser, and an evaporator to reclaim the heat normally transferred to the atmosphere by the refrigerant, the apparatus including a heat exchanger for transferring heat from the refrigerant to a heat transfer medium as it leaves the compressor but before it enters the condenser and the refrigerant as it leaves the compressor having a quantity of heat Q_1 available for reclamation defined by $Q_1 = M_1 [h_g^e + (1-x) h_{fg}^e]$, where M_1 is the mass flow rate of the refrigerant in the system, h_g^i is the enthalpy of the refrigerant gas leaving the compressor, h_g^e the enthalpy of the refrigerant gas leaving the heat exchanger, x the quality of the refrigerant as it leaves the heat exchanger, and h_{fg}^e the difference in enthalpy between saturated liquid refrigerant and saturated vapor refrigerant leaving the heat exchanger, the heat exchanger having tubular first and second flow paths for, respectively, the refrigerant and the fluid transfer medium respectively which flow through said flow paths in opposite directions, the improvement in which said heat exchanger comprises:

a dividing wall separating said first and second flow paths and having a surface area A,



means for circulating said heat transfer medium through said second flow path with a mass flow rate M_2 and a predetermined velocity,

said dividing wall having a heat transfer coefficient U,

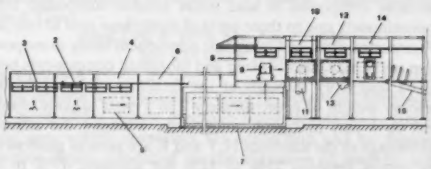
said heat exchanger being constructed with its said surface area A and its said heat transfer coefficient U for its said dividing wall and with a mass flow rate M_2 and said predetermined velocity for said heat transfer medium through said second flow path such that the heat transferred to said heat transfer medium, when the inlet temperature of said heat transfer medium is at its expected minimum value, is proportionally so related to the quantity of heat Q_1 available for reclamation that the quality x of the refrigerant exiting from said first flow path of said heat exchanger will not go below about 0.25.

4,089,668

GLASS PLATE BENDING PROCEDURE

Mauro Comastri, Monza, Italy, assignor to Societe Italiana Vetro SIV SpA, San Salvo, Italy

Filed Apr. 22, 1977, Ser. No. 789,980
Claims priority, application Italy, Apr. 22, 1976, 49126 A/76
Int. Cl.² C03B 23/02
U.S. Cl. 65—104 **4 Claims**



1. A procedure for curving and tempering glass plates, particularly glass plates of a thickness of 4 mm and less, which procedure comprises the operations of suspending the glass plate by clamping to be subjected to the curving and tempering treatment with its long side turned in the direction of transport, feeding said glass plate in a horizontal direction to and into a heating oven, carrying said suspended glass plate in said horizontal direction through said heating oven while heating said glass plate to the softening temperature thereof, withdrawing said suspended softened glass plate in a vertical direction upwardly from the heating oven at the end of the heating stage; carrying the suspended glass plate in said vertical direction into a curving press overlaying said oven and positioning it

between a mold and countermold in said press in order to confer to it the desired curvature.

4,089,669

SOIL NEUTRALIZING SLURRIES

Edgar W. Sawyer, Jr., Hagerstown, Md., assignor to International Telephone & Telegraph Corporation, Nutley, N.J.

Continuation of Ser. No. 539,214, Jan. 7, 1975, abandoned. This application May 28, 1976, Ser. No. 691,110

Int. Cl.[2] C05D *3/02*

U.S. Cl. 71—11 **5 Claims**

1. A highly concentrated, homogeneous, stable and pourable soil neutralizing slurry, comprising:

water;

at least one dispersed ground particulate material, selected from the group consisting of calcium carbonate and dolomitic lime, in an amount equal to 60 to 70% by-weight of the slurry;

a gelling grade clay mineral additive selected from the group consisting of attapulgite, sepiolite, Wyoming bentonite and hectorite in an amount of from 0.5 to 5.0% by-weight of said slurry to maintain the particulate material in a stable, homogeneous suspension that is pourable; and

a polyanionic dispersing agent in an amount of from 0.05 to 2.0% by-weight of the clay mineral to disperse the particulate material but not the clay mineral, wherein high concentrations of particulate material are dispersed in a homogeneous slurry that is stable and not subject to settlement while being pourable and readily adapted to application by spraying.

4,089,670

HIGH ANALYSIS FERTILIZERS

Roger Calvin Funk, Kent, Ohio, assignor to The Davey Tree Expert Company, Kent, Ohio

Continuation-in-part of Ser. No. 634,108, Nov. 21, 1975, Pat. No. 4,036,627. This application May 24, 1977, Ser. No. 800,125

The portion of the term of this patent subsequent to Jul. 19, 1994, has been disclaimed.

Int. Cl.[2] C05C *9/00*

U.S. Cl. 71—29 **11 Claims**

1. A dry high analysis fertilizer composition containing the nutrients N, P and K comprising organic and inorganic nutrient components, said organic component being a powdered ureaformaldehyde blend of a size to pass an 60-mesh sieve, said ureaformaldehyde having generally water soluble and water insoluble nitrogen releasing nutrient compounds, said water insoluble compound being methylene urea and said water soluble compound being unreacted urea, the ratio of said water insoluble compound to said water soluble compound being approximately one to three parts of methylene urea to one part of unreacted urea, said inorganic component being monopotassium phosphate, said organic and inorganic components being mixed uniformly throughout the fertilizer composition in a ratio by weight of approximately 2 to 5 parts organic component to 1 part inorganic component, whereby the effective percentage of the nutrients N, P and K are present generally in the ranges between 25% to 32% for nitrogen, 17% to 8% phosphorus expressed as P_2O_5, and 12% to 5% soluble potash expressed as K_2O.

4,089,671

N,N'-METHYLENEBIS-[O,O-DIARYL N-PHOSPHONOMETHYLGLYCINONITRILES]

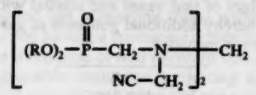
Gerard A. Dutra, Ladue, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 750,327, Dec. 13, 1976. This application Jun. 20, 1977, Ser. No. 807,954

Int. Cl.[2] A01N *9/36*; C07C *9/40*

U.S. Cl. 71—86 **28 Claims**

1. A compound of the formula



wherein R represents phenyl, naphthyl, substituted phenyl or substituted naphthyl, there being up to two substituents selected from halogen or alkyl, alkoxy and alkylthio of up to four carbon atoms.

9. A herbicidal composition comprising a herbicidally effective amount of a compound of claim 1 and an inert diluent.

17. A herbicidal method which comprises contacting a plant with a herbicidally effective amount of a compound of claim 1.

4,089,672

1-(SUBSTITUTED-HYDROCARBYL)-DI- AND TRIHALOPYRAZOLES

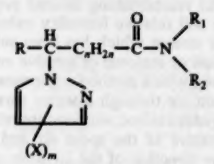
Gabriel Kornis; Eldon G. Nidy; Henry J. Vostral, all of Kalamazoo, Mich., and Arnolds Steinhards, deceased, late of Kalamazoo, Mich. (by John J. Killinger, administrator), assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 316,902, Dec. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 12,871, Feb. 19, 1970, abandoned. This application Jan. 23, 1976, Ser. No. 651,620

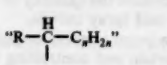
Int. Cl.[2] C07D *231/16*; A01N *9/22*

U.S. Cl. 71—92 **39 Claims**

1. 1-(substituted-hydrocarbyl)-di- and trihalopyrazoles of the formula:



wherein "*n*" is an integer 0, 1, 2, or 3; "X" is a halogen atom; "*m*" is the integer 2 or 3, the halogen atoms being selected independently; "R" is hydrogen, alkyl of from 1 to 10 carbon atoms, inclusive, or alkenyl of from 2 to 10 carbon atoms, inclusive, the sum of the carbon atoms in the group



being not more than 11; and R_1 and R_2 are hydrogen atoms or independent substituent groups more fully described as follows:

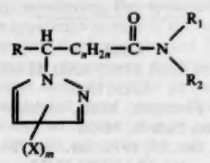
Individually, R_1 and R_2 are lower-alkyl of from 1 to 8 carbon atoms, inclusive; alkenyl of from 3 to 8 carbon atoms, inclusive; alkynyl of from 3 to 8 carbon atoms, inclusive; aralkyl of from 7 to 13 carbon atoms, inclusive; aryl of from 6 to 10 carbon atoms, inclusive (provided both R_1 and R_2 are not aryl at the same time); cycloalkyl of from 3 to 8 carbon atoms, inclusive; cycloalkenyl of from 4 to 8 carbon atoms, inclusive and

Collectively, the

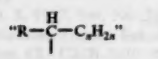
group is a alkyleneamino of from 3 to 7 ring atoms, inclusive, having a total of not more than 15 carbon atoms.

30. The method of controlling weeds and regulating the growth of plants which comprises applying to germinating

weed seeds, weed seedlings, and other plants a herbicidal or plant growth regulating amount of a 1-(substituted-hydrocarbyl)-di- or trihalopyrazole of the formula:



wherein "*n*" is an integer 0, 1, 2, or 3; "X" is a halogen atom; "*m*" is the integer 2 or 3, the halogen atoms being selected independently; "R" is hydrogen, alkyl of from 1 to 10 carbon atoms, inclusive, or alkenyl of from 2 to 10 carbon atoms, inclusive, the sum of the carbon atoms in the group



being not more than 11; and R_1 and R_2 are hydrogen atoms or independent substituent groups more fully described as follows:

Individually, R_1 and R_2 are lower-alkyl of from 1 to 8 carbon atoms, inclusive; alkenyl of from 3 to 8 carbon atoms, inclusive; alkynyl of from 3 to 8 carbon atoms, inclusive; aralkyl of from 7 to 13 carbon atoms, inclusive; aryl of of from 6 to 10 carbon atoms, inclusive (provided both R_1 and R_2 are not aryl at the same time); cycloalkyl of from 3 to 8 carbon atoms, inclusive; cycloalkenyl of from 4 to 8 carbon atoms inclusive; and

Collectively, the

group is alkyleneamino of from 3 to 7 ring atoms, inclusive, having a total of not more than 15 carbon atoms.

4,089,673

HALOGENATED KETONES AS HERBICIDE ANTIDOTES

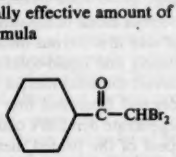
Duane R. Arneklev, Antelope, Mont.; Ferenc M. Pallos, Walnut Creek, and Edmund J. Gaughan, Berkeley, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 527,662, Nov. 25, 1974, Pat. No. 3,976,469, which is a continuation of Ser. No. 307,301, Nov. 16, 1972, abandoned. This application May 24, 1976, Ser. No. 689,704

Int. Cl.[2] A01N *9/22, 9/24*

U.S. Cl. 71—93 **2 Claims**

1. The method of reducing injury to cotton injured by a triazine herbicide comprising applying to the soil in which said crop is to grow and in which said herbicide is applied a non-phytotoxic antidotally effective amount of a compound corresponding to the formula



4,089,674

SELECTIVE HERBICIDES

Michael Joseph Brown, Woodley; David Cartwright, Reading; David John Collins, Ascot, and Brian Graham White, Crowthorne, all of England, assignors to Imperial Chemical Industries Limited, London, England

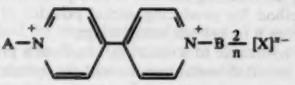
Filed Apr. 26, 1976, Ser. No. 680,125

Claims priority, application United Kingdom, Apr. 28, 1975, 17513/75

Int. Cl.[2] A01N *9/22; C07D 401/02*

U.S. Cl. 71—94 **4 Claims**

1. A process of selectively killing or severely damaging oats growing in cereal crops other than oats, which comprises applying to the crop area, in an amount sufficient to kill or severely damage the oats, but insufficient to damage the crop substantially, a 4,4′-bipyridylium diquaternary salt of the formula:



wherein X^- represents an essentially non-phytotoxic anion, *n* is 1, 2, 3 or 4, and A and B, which may be the same or different, each stand for alkyl, alkenyl, substituted alkyl or substituted alkenyl, the number of carbon atoms in the alkyl or alkenyl groups taken together being from four to ten excluding carbon atoms present in any substitution on said alkyl or alkenyl group, any such substitution being selected from the group consisting of cyano, halogen, alkynyl of 3–6 carbon atoms, hydroxyl, alkoxy of 1–6 carbon atoms, alkoxy-carbonyl wherein the alkoxy group contains 1–6 carbon atoms, alkylthio wherein the alkyl contains 1–6 carbon atoms, hydroxyimino, acylamido wherein the acyl is acetyl, propionyl or butyryl and alkoxycarbonylamino wherein the alkoxy contains 1–6 carbon atoms provided that when A or B is N-butyl, the other is not N-butyl.

4,089,675

COMBINATION BENEFICIATION ILMENITE DIGESTION LIQUOR REDUCTION PROCESS

Peter Joseph Preston; George Leathwhite Roberts, Jr.; Dennis Arthur Filimore, and Gerard Martin Sheehan, all of Savannah, Ga., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 5, 1976, Ser. No. 729,913

Int. Cl.[2] C22B *1/00*

U.S. Cl. 75—1 T **2 Claims**

1. A process for producing a high TiO_2 content chlorination feed stock and a sulfate digestion liquor substantially free of ferric iron which comprises (1) contacting (A) an ilmenite digestion liquor produced by the digestion of ilmenite with sulfuric acid and containing ferric salts and sulfuric acid at the quantity level produced in the digestion process with (B) a quantity of reduced ilmenite containing metallic iron sufficient to reduce the ferric iron contained in said ilmenite digestion liquor to the ferrous state, at a temperture between about 20° C and the boiling point of said ilmenite digestion liquor and until the reduction of ferric iron is substantially complete, whereby substantially all the iron is removed from said reduced ilmenite and substantially all ferric iron in said digestion liquor is reduced to ferrous iron, (2) charging the so-contacted reduced ilmenite to a TiO_2 chlorination process and (3) charging the so-contacted sulfate digestion liquor to a TiO_2 sulfuric acid process.

4,089,676

METHOD FOR PRODUCING NICKEL METAL POWDER

James D. Grundy, Williamsville, N.Y., assignor to Williams Gold Refining Company Incorporated, Buffalo, N.Y.

Filed May 24, 1976, Ser. No. 689,559
Int. Cl.[2] C22B *23/04;* C22C *1/04*
U.S. Cl. 75—.5 AA 10 Claims

1. A method for producing nickel powder of controlled geometry from a nickel salt comprising:
   a. adding hydrazine to a nickel salt to form a precipitate;
   b. adding an alkali metal base to said precipitate;
   c. controlling the geometry of the ultimate nickel powder end product by selecting the amount of said base in a range from about 0.117 to about 1.76 moles of alkali metal base per mole of nickel in said salt while maintaining the amount of said hydrazine in a range from about 2.0 to about 2.5 milliliters of hydrazine per gram of nickel in said salt; and
   d. heating the resulting mixture to precipitate nickel powder.

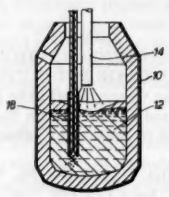
10. A method for producing nickel powder of controlled geometry from a nickel salt comprising:
   a. adding hydrazine to a nickel salt to form a precipitate;
   b. adding an alkali metal base to said precipitate;
   c. heating the precipitate in a first temperature range below about 96° C;
   d. adding an alkali metal base to the heated precipitate;
   e. heating the resulting mixture in a second temperature range below about 96° C to precipitate nickel powder, said second temperature range being selected to control the geometry of the nickel powder end product; and
   f. at least one of said hydrazine and said base being added in an amount selected to control the geometry of the nickel powder end product.

4,089,677

METAL REFINING METHOD AND APPARATUS

Gene D. Spenceley; Robert Baker, and Roger A. Page, all of Sheffield, England, assignors to British Steel Corporation, London, England

Filed May 20, 1977, Ser. No. 799,102
Claims priority, application United Kingdom, May 28, 1976, 22341/76
Int. Cl.[2] C21C *5/32*
U.S. Cl. 75—51 17 Claims



1. A method of raising the energy level of molten metal in a metallurgical vessel in the course of manufacturing steel which comprises injecting solid carbonaceous material into said molten metal below the surface thereof and introducing an oxidizing gas into the vessel to react with the carbonaceous material to liberate heat.

4,089,678

METHOD AND PRODUCT FOR PROTECTING MOLTEN MAGNESIUM

Joseph D. Hanawalt, 745 Heatherway, Ann Arbor, Mich. 48104

Continuation of Ser. No. 601,391, Aug. 1, 1975, abandoned. This application Feb. 7, 1977, Ser. No. 766,378
Int. Cl.[2] C22B *26/20*
U.S. Cl. 75—67 A 9 Claims

1. A reaction inhibiting agent for forming a protective atmosphere over molten magnesium by sublimation, comprising a solidified solution consisting of carbon dioxide having dissolved therein a proportion of sulfur hexafluoride lying within the range of two tenths of one percent to three percent of the total.

4,089,679

STEEL ALLOY FOR ZINC AND ALUMINUM DIE CASTING

Kenneth Zecman, Plymouth, Mich., assignor to Pennsylvania Steel Corporation, Detroit, Mich.

Filed Oct. 18, 1976, Ser. No. 733,259
Int. Cl.[2] C22C *38/22*
U.S. Cl. 75—126 C 4 Claims

1. A steel alloy composition consisting essentially of the following ingredients by weight approximately:

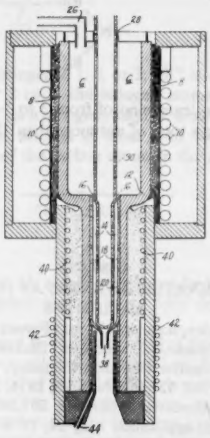
Carbon	.15%
Manganese	.67%
Silicon	.30%
Chromium	1.77%
Molybdenum	.47%
Tungsten	.11%
Iron	Balance.

4,089,680

METHOD AND APPARATUS FOR FORMING FERROUS LIQUID-SOLID METAL COMPOSITIONS

Merton C. Flemings, Cambridge; Kenneth P. Young, Arlington, both of Mass., and Rodney G. Riek, Manchester, Mo., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 725,903, Sep. 22, 1976. This application Jan. 17, 1977, Ser. No. 759,956
Int. Cl.[2] C22C *33/05*
U.S. Cl. 75—129 28 Claims



1. The method for forming a ferrous metal composition having solid discrete degenerate dendrites homogeneously dispersed within a liquid phase of said ferrous metal composition which comprises:
   a. heating a first ferrous metal composition to form a liquid-solid mixture of said first ferrous metal composition,
   b. vigorously agitating said liquid-solid mixture in an agitation zone to convert the solid therein to discrete degenerate dendrites derived from said first ferrous metal compositon, said degenerate dendrites comprising up to about 85 weight percent of the heated metal composition and wherein the remainder of the heated ferrous metal compo-

sition is liquid wherein the surface in said agitation zone contacting said liquid-solid mixture comprises high density recrystallized alumina,

c. continuously monitoring the apparent viscosity or an analog of the apparent viscosity of the liquid-solid mixture thereby to control the heat extracted from said mixture when the descrete degenerate dendrites content of said mixture is above about 65 weight percent and

d. removing said heated metal composition from said agitation zone through an outlet that is protected from contact with air by an inert to protective gas surrounding said outlet.

4,089,681

PROCESS FOR THE MANUFACTURE OF STEEL PRODUCTS

André Louis Gueussier, Persan-Beaumont, France, assignor to Cefilac, Paris, France

Filed Feb. 3, 1977, Ser. No. 765,409
Claims priority, application France, Feb. 3, 1976, 76 03538
Int. Cl.² C22B *5/10*
U.S. Cl. 75—133.5 **11 Claims**

1. Process for the manufacture of steel products from an enriched ore without passing through the liquid phase comprising the steps of:

(1) forming a concentrated iron ore by crushing an enriched iron ore, pre-reducing the crushed ore, crushing the pre-reduced ore to a granulometry less than or equal to that of the ore before pre-reduction and magnetically enriching the ore,

(2) forming a billet from a mixture of (a) a concentrated iron ore in powder form having a non-reducible oxide content below 1% by weight (b) a lubricant and (c) a carbonized reducing agent,

(3) compacting the billet,

(4) heating the compacted billet under a non-oxidizing atmosphere at a temperature from 1100° to 1350° C to reduce the ore and form a non-oxidized porous steel billet, and

(5) working the hot billet to form the steel product.

4,089,682

COBALT-BASE SINTERED ALLOY

Yuichi Saito, and Osamu Mayama, both of Niigata, Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 24, 1976, Ser. No. 744,783
Claims priority, application Japan, Dec. 18, 1975, 50-150122
Int. Cl.² B22F *3/00*
U.S. Cl. 75—236 **4 Claims**

1. A cobalt-base sintered alloy having a density of at least 95 percent of the theoretical density thereof, and consisting essentially of, in weight percentage:

chromium from 15.0 to 35.0
tungsten from 3.0 to 19.0
nickel from 0.2 to 12.0
molybdenum from 0.1 to 15.0
iron from 0.05 to 5.00
titanium from 0.05 to 2.00
silicon from 0.05 to 1.50
manganese from 0.05 to 1.00
carbon from 0.2 to 3.5
and the balance cobalt and incidental impurities;

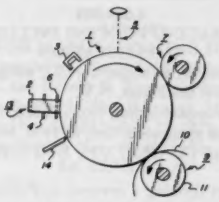
said cobalt-based sintered alloy being prepared by sintering a reduced powder mixture consisting of said metals and carbides of said metals, said reduced powder mixture being prepared by the steps comprising simultaneously reducing a mixed powder consisting essentially of powders of oxides of elements constituting said sintered alloy and carbon powder to produce a reduced sponge-like mass, and pulverizing said reduced sponge-like mass to obtain said reduced powder mixture; said alloy and said reduced powder mixture having substantially the same elemental chemical composition.

4,089,683

LIQUID DEVELOPER CLEANING MEANS

James J. Knieser, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 29, 1975, Ser. No. 626,954
Int. Cl.² G03G *21/00*
U.S. Cl. 96—1 LY **19 Claims**



1. A method for improved conditioning of reusable imaging surfaces after the liquid development thereon of a charge pattern and the transfer therefrom of the developed image, said method comprising:

(a) bringing the imaging surface into moving contact with a cleaning means; and thereafter

(b) bringing the imaging surface into substantially transverse moving contact with a moving compressible, resilient belt having a pattern of raised and depressed portions on the substantially non-absorbing, non-porous, solid working surface for redistributing irregular deposits of liquid developer remaining on the imaging surface after cleaning to those areas of the imaging surface bearing lesser or no residual liquid developer, the redistributed liquid developer being present on the imaging surface in thicknesses which are non-transferable.

4,089,684

IMAGING METHOD UTILIZING THE CHEMICAL REACTIVITY OF DONOR-ACCEPTOR MIXTURES

Franklin D. Saeva; George R. Olin, both of Webster, and William W. Limburg, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 31, 1977, Ser. No. 763,782
Int. Cl.² G03G *13/00, 13/22*
U.S. Cl. 96—1.1 **2 Claims**

1. An imaging method based upon a photoinitiated chemical degradation reaction of a component of a photosensitive mixture within a polymeric film, said photosensitive mixture containing a non-polymeric electron donor material and a non-polymeric electron acceptor material, the method comprising:

(a) providing a film of polymeric material containing at least about 1 percent by weight of a mixture which includes a non-polymeric electron donor compound and a non-polymeric electron acceptor compound, the relative mole ratio of donor the acceptor compounds in said mixture being in the range of from about 10:1 to about 1:10, and the electron releasing propensity of the donor compound relative to the electron withdrawing propensity of the electron acceptor compound tending to preclude electron transfer therebetween in the absence of illumination with activating electromagnetic radiation;

(b) forming a latent image within said film by selectively exposing the mixture to sufficient activating electromagnetic radiation to cause at least one of said electron donor compounds and said electron acceptor compounds of the mixture to undergo an electronic transition from the ground to the excited state, whereby one of said compounds undergoes an irreversible electrochemical reaction as a result of charge transfer incident to such electronic transition, said irreversible electrochemical reaction resulting in the decomposition of the compound of the mixture undergoing said reaction, thereby inducing

within said selectively exposed areas of the film modifications in the film's properties; and

(c) rendering said latent image visible by creating a field across said film followed by heating said film to or slightly above its glass transition temperature whereby the exposed areas of the film take on a frosted appearance.

4,089,685

REVERSAL IMAGING PROCESS INCLUDING REDOX AMPLIFICATION

Vernon L. Bissonette, Brockport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 628,880, Nov. 5, 1975, abandoned. This application Oct. 8, 1976, Ser. No. 730,912

Int. Cl.² G03C *7/16, 5/50, 5/26*

U.S. Cl. 96—22 **21 Claims**

1. A method of forming a reversal dye image comprising

developing to produce a silver image an imagewise exposed photographic element comprised of a support and at least one radiation-sensitive negative-working silver halide layer containing a developable latent image therein,

poisoning the silver image to inhibit its ability to catalyze a redox reaction between a peroxide oxidizing agent and a dye-image-generating reducing agent capable of providing a dye-image-generating reaction product upon oxidation, wherein the peroxide oxidizing agent and the reducing agent are chosen so that they are essentially inert to oxidation-reduction in the absence of a catalyst,

rendering undeveloped silver halide remaining in the radiation-sensitive layer developable,

developing the remaining silver halide to form a reversal silver image, and

catalyzing with the reversal silver image a redox reaction between the peroxide oxidizing agent and the reducing agent to permit a dye image to be formed corresponding to the reversal silver image.

4,089,686

METHOD OF DEPOSITING A METAL ON A SURFACE

Wesley Peter Townsend, Princeton Township, Mercer County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

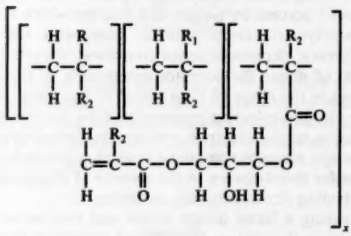
Filed Apr. 19, 1976, Ser. No. 678,327

Int. Cl.² G03C *5/00*

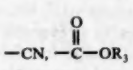
U.S. Cl. 96—35.1 **9 Claims**

1. A method of depositing a metal on a dielectric surface of a substrate, which comprises:

(a) selectively polymerizing on the surface a photopolymerizable composition, comprising an addition polymer containing a plurality of units of the formulae



where R and R_1 are each a member taken from the group consisting of



and pyrrolidone, R_3 is an alkyl group of 1 to 18 carbons, R_2 is a member selected from the group consisting of H and CH_2, and x is a positive integer of 10 to 1000, to form a polymerized coating thereof on the surface to delineate an uncoated portion of the surface, conforming to a desired metallic pattern, capable of retaining a noble metal species thereon;

(b) treating said polymerized coating containing surface with an essentially tin species free solution comprising a noble metal ion to selectively deposit said noble metal ion on said uncoated portion of said surface, wherein said noble metal ion is not retained on or deposited on said polymerized coating; and

(c) exposing said treated surface to an electroless metal deposition solution to selectively deposit a metal on said deposited uncoated portion of the surface.

4,089,687

PHOTOGRAPHIC METHOD FOR PRINTING PARTICLE PATTERN WITH IMPROVED ADHERENCE UTILIZING VANADATES

Stanley Arthur Harper, New Providence, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 11, 1973, Ser. No. 405,507

Int. Cl.² G03C *5/00*

U.S. Cl. 96—35.1 **4 Claims**

1. A photographic method for printing a pattern of particulate material upon a supporting surface comprising:

(a) applying to said supporting surface a coating comprised of a water-soluble polymer which is crosslinkable into insoluble form by actinic radiation in the presence of hexavalent chromium ions, a water-soluble dichromate photosensitizer for said polymer, at least one water-soluble vanadate selected from the group consisting of sodium vanadate, potassium vanadate and ammonium vanadate, and said particulate material, said soluble vanadate being present in said coating in concentrations of about 0.1 to 4.0 weight percent of the weight of said water-soluble polymer,

(b) exposing said coating to a pattern of said actinic radiation until exposed portions of said coating are rendered insoluble,

(c) and flushing said exposed coating with an aqueous solvent to remove soluble portions of said coating while retaining insoluble portions of said coating in place.

4,089,688

POLYMERIC N-ALKENYL CARBAMATE SILVER HALIDE PEPTIZER

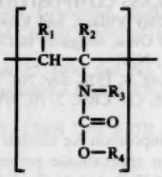
Maurice J. Fitzgerald, Canton, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 638,819, Dec. 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 548,898, Feb. 11, 1975, abandoned, which is a continuation-in-part of Ser. No. 337,432, Mar. 2, 1973, abandoned. This application Jun. 13, 1977, Ser. No. 805,864

Int. Cl.² G03C *1/72*

U.S. Cl. 96—114 **20 Claims**

1. A photosensitive silver halide emulsion wherein the silver halide grains have adsorbed on their surface a substantially continuous layer of an emulsion peptizer consisting essentially of a water-soluble film-forming polymeric silver halide grain-growing protective colloid having in its structure at least about 0.5 mole percent repeating units of the formula:



wherein R_1 is hydrogen, a lower alkyl group or a halogen;
R_2 is hydrogen, a lower alkyl group, halogen or cyano group;
R_3 is hydrogen, a lower alkyl or lower cycloalkyl group; and
R_4 is a lower alkyl or lower cycloalkyl group, or a combination of R_3 and R_4 represents the atoms necessary to complete a heterocyclic ring structure.

4,089,689

PETROLEUM OXIDATE AND CALCIUM DERIVATIVES THEREOF

Orville W. Rigdon, Groves, and Anthony Macaluso, Sr., Port Arthur, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Jul. 3, 1975, Ser. No. 592,954
Int. Cl.[2] C09D 5/08
U.S. Cl. 106—14.28 9 Claims

1. An oxidate of a deasphalted residual oil derived from a sweet naphthene base crude, said oxidate having a Neut. No. between about 40 and 50, a Sap. No. between about 85 and 105, a melting point between about 85° and 115° F., and a SUS viscosity at 210° F. of between 1200 and 2500, said residual oil having an SUS viscosity at 210° F. between about 150 and 170, an average molecular weight between about 300 and 900, a hydrocarbon saturate content between about 40 and 60 wt. %, an aromatic hydrocarbon content of between about 60 and 40 wt. % and a methylene to methyl group mole ratio of between about 1:1 and 2.5:1.

7. A liquid cutback composition affording corrosion protection and of antigelling properties comprising:

(a). between about 0.1 and 90 wt. % of a calcium soap of antigelling properties having a calcium content of between about 1.2 and 1.9 wt. % prepared by neutralizing a petroleum oxidate with lime utilizing a lime quantity of between about 100 and 125 wt. % of stoichiometric, said petroleum oxidate prepared from a deasphalted residual oil derived from a sweet naphthene base crude, said petroleum oxidate having a Neut. No. between about 40 and 50, a Sap. No. between about 85 and 105, a melting point between about 85° and 115° F., and an SUS viscosity at 210° F. of between about 1200 and 2500, said residual oil having an SUS viscosity at 210° F. between about 150 and 170, an average molecular weight between about 300 and 900, a hydrocarbon saturate content between about 40 and 60 wt. %, an aromatic hydrocarbon content of between about 60 and 40 wt. % and a methylene to methyl mole ratio of between about 1:1 and 2.5:1.

(b). between about 99.9 and 10 wt. % of an inert liquid hydrocarbon solvent of a boiling point between about 220° and 520° F.

4,089,690

CORROSION INHIBITING COATINGS FOR STEEL

Rüdiger Pantzer, Stuttgart, and Josef Ruf, Ditzingen, both of Germany, assignors to BASF Farben & Fasern AG, Hamburg, Germany

Filed Jan. 2, 1976, Ser. No. 646,036
Claims priority, application Germany, Jan. 24, 1975, 2502781
Int. Cl.[2] C09D 5/08
U.S. Cl. 106—14.23 6 Claims

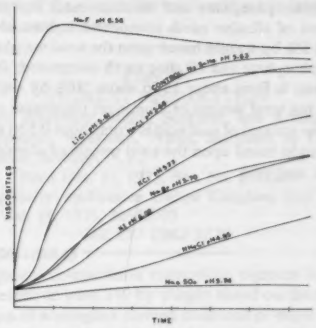
1. In a coating composition capable of inhibiting corrosion of steel coated therewith, the composition essentially consisting of an airdrying or baking coating vehicle and a corrosion inhibiting pigment, the improvement which consists in said pigment including an amount of a zinc salt of an acid selected from the group consisting of 5-nitroisophthalic acid and mononitroterephthalic acid, said amount being effective in inhibiting corrosion of the coated steel.

4,089,691

METHOD FOR MANUFACTURING FOUNDRY CORES

Robert G. Cummisford, Brookfield; Richard J. Wasielewski, Milwaukee, and Robert K. Krueger, Sheboygan, all of Wis., assignors to Krause Milling Company, Milwaukee, Wis.

Division of Ser. No. 551,882, Feb. 21, 1975, Pat. No. 4,013,629.
This application Nov. 12, 1976, Ser. No. 741,177
Int. Cl.[2] B28B 7/34
U.S. Cl. 106—38.4 20 Claims



1. A method of manufacturing a foundry core comprising mixing sand and heat-accelerated curable binder system wherein the binder system is produced by the following steps, the percentages being a percent of sand:

(a) crosslinking 1–3% of saccharide-containing matter with 0.15–3% of 40% glyoxal aqueous solution;

(b) controlling, by accelerating or retarding, the rate of reaction by the use of 0.3–1.0% alkali halide as a catalyst using 0.4% water, 0–10% betonite, 0–10% silica flour, 0–10% iron oxide, and 0–1% of a material selected from the group comprising wax, wax emulsion, asphalt emulsion, and wax-asphalt emulsion, the reaction being at such a temperature and pressure relationship as to maintain a liquid condition during the reaction.

(c) forming the mixture to desired shape and causing it to cure to a hardened state.

4,089,692

SETTABLE COMPOSITION CONTAINING ALUMINUM PHOSPHATE AND METHOD FOR PREPARING SAME

Richard H. Toeniskoetter, Worthington, and John J. Spiwak, Columbus, both of Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.

Continuation-in-part of Ser. No. 455,474, Mar. 27, 1974. This application Jun. 18, 1975, Ser. No. 588,121
Int. Cl.[2] B28B 7/34
U.S. Cl. 106—38.35 34 Claims

1. Process for preparing settable composition comprising:

(A) providing aluminum phsophate;

(B) providing solid organic carboxylic acid;

(C) providing oxygen-containing alkaline earth compound;

(D) providing water; and

(E) admixing said aluminum phosphate, said solid organic carboxylic acid, said alkaline earth material, and water provided that said solid organic carboxylic acid and said alkaline earth material are not precontacted with each

other prior to contact of the alkaline earth material with the aluminum phosphate; and

(F) wherein said aluminum phosphate contains 0 to about 40 mole % of boron based upon the moles of aluminum and contains a mole ratio of phosphorus to total moles of aluminum and boron of at least about 2:1;

(G) said solid organic carboxylic acid being soluble in aqueous solutions of the aluminum phosphate and containing at least two substituents selected from the group consisting of at lease two carboxylic acid groups; and at lease one carboxylic acid group, and at least one hydroxyl group, or keto tautomers thereof;

(H) said alkaline earth metal compound contains alkaline earth metal and an oxide; and is capable of reacting with the aluminum phosphate; and

(I) wherein the amount of aluminum phosphate is from about 50 to about 95% by weight based upon the total weight of aluminum phosphate and alkaline earth compound; the amount of alkaline earth compound is from about 50 to about 5% by weight based upon the total weight of aluminum phosphate and alkaline earth compound; the amount of water is from about 15 to about 50% by weight based upon the total weight of aluminum phosphate and water; and the amount of said acid is from about 0.5 to about 25% by weight based upon the total weight of aluminum phosphate, and acid.

4,089,693

GLASS FOR TELEVISION DISPLAY CATHODE-RAY TUBES

Coenraad Maria La Grouw, and Plaeger Marius, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 75,783, Sep. 25, 1970, abandoned. This application June 6, 1974, Ser. No. 476,787

Claims priority, application Netherlands, Oct. 3, 1969, 6915059

Int. Cl.[2] C03C *3/04*

U.S. Cl. 106—52 **2 Claims**

1. Glass for envelope of television display cathode-ray tubes, particularly intended for the face plate of the tube consisting essentially of the composition in % by weight

SiO_2	60 - 63	
Na_2O	7 - 9	$[Na_2O] + [K_2O]$ 15–18
K_2O	7 - 10	
Al_2O_3	0 - 3	
MgO + Ca0	1 - 3	
BaO	11 - 15	$[BaO] + 2[ZrO_2] > 18$
ZrO_2	3 - 5	
Sb_2O_3	0 - 1	$[ZrO_2] + [Al_2O_3] < 6$
As_2O_3	0 - 0.3	$[Sb_2O_3] + [As_2O_3]$ combined $\geqq 0.3$
CeO_2	0.05 - 0.3	

wherein the temperature difference between the softening point and the annealing point of said glass is at least 190° C, wherein said glass has an annealing point of at least 485° C, wherein said glass has a coefficient of expansion of approximately 100×10^{-7} between 30° and 300° C and wherein a screen of said glass approximately 11 mm. thick transmits no more than 0.5 mr/h measured at a distance of 5. cms. from the screen when struck by a stream of electrons developed by an electrode having an acceleration voltage of up to 40K volts at an anode current of approximately 300μa.

4,089,694

GLASS COMPOSITION

George L. Thomas, Bay Village, and Edward L. Woodall, Jr., Lyndhurst, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 4, 1976, Ser. No. 711,437

Int. Cl.[2] C03C *3/10, 3/04*

U.S. Cl. 106—53 **2 Claims**

1. A seal glass composition for electric devices which consists essentially of in approximate percent by weight 65–75 SiO_2, 9–13 Na_2O, 3–6 K_2O, 1–4 Al_2O_3, 4–8 CaO, 0–4 BaO, 0–6 PbO, 0–1F, and 0–2 Li_2O along with minor amounts of incidental impurities, residual fluxes, and refining agents, and wherein the Na_2O to K_2O ratio lies between about 1.5 to about 4.5 with a high Na_2O/K_2O ratio when the CaO is high whereas the Na_2O/K_2O ratio is low when the CaO is low, said glass composition having a softening point in the approximate range 625°–670° C, a sealing point in the approximate range 820°–870° C, a working point in the approximate range 950°–990° C, a working range of at least 300° C, an average coefficient of linear thermal expansion in the 0°–300° C temperature range between about 87×10^{-7} cm/cm/° C to about $97 \times 10-7$ cm/cm/° C, and electrical resistivity greater than $10^{7.1}$ ohm-cm at 250° C together with an electrical resistivity greater than $10^{5.5}$ ohm-cm at 350° C.

4,089,695

HYDRAULIC CEMENT MIXES AND PROCESS FOR IMPROVING HYDRAULIC CEMENT MIXES

James A. Ray, Mantua, Ohio, assignor to Martin Marietta Corporation, Bethesda, Md.

Filed Aug. 17, 1976, Ser. No. 715,189

Int. Cl.[2] C04B *7/02*

U.S. Cl. 106—89 **12 Claims**

1. A hydraulic cement mix including Portland type cement, aggregate, sufficient water to effect hydraulic setting of the cement, and an additive comprising an alkali or alkaline earth fluotitanate, said additive being present in an amount sufficient to retard the rate of hardening of said cement mix.

7. A process for advantageously retarding the rate of hardening of Portland type cement mixes comprising incorporating in a hydraulic cement mix, including a hydraulic cement, aggregate and sufficient water to effect hydraulic setting of said cement, an additive comprising an alkali or alkaline earth fluotitanate and being present in an amount sufficient to retard the rate of hardening of said cement mix.

4,089,696

HYDRAULIC CEMENT MIXES AND PROCESS FOR IMPROVING HYDRAULIC CEMENT MIXES

James A. Ray, Mantua, Ohio, assignor to Martin Marietta Corporation, Bethesda, Md.

Filed Oct. 8, 1976, Ser. No. 731,021

Int. Cl.[2] C04B *7/35*

U.S. Cl. 106—90 **8 Claims**

1. A process for increasing the compressive strength and accelerating the rate of hardening of portland type cement mixes comprising adding to said cement in additive comprising at least one acetic acid ester of glycerin in an amount of between about 0.025% and about 2.0% by weight based upon the weight of the cement when said ester is monoacetin or diacetin and in an amount of between about 0.01% and about 2.0% by weight based upon the weight of the cement when said ester is triacetin to thereby accelerate the rate of hardening of said mix and increase the compressive strength of the mix when hardened.

4,089,697

MANUFACTURE OF PORTLAND CEMENT

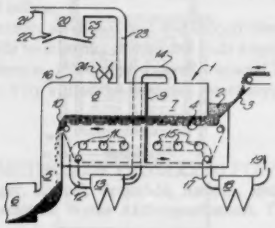
Anthony Robin Pennell, Gravesend, England, assignor to The Associated Portland Cement Manufacturers Limited, London, England

Filed Feb. 17, 1976, Ser. No. 658,824

Claims priority, application United Kingdom, Feb. 26, 1975, 8032/75

Int. Cl.[2] C04B 7/02; F27B 15/00

U.S. Cl. 106—100 3 Claims



1. In the method of making Portland cement clinker which comprises the steps of continuously introducing Portland cement raw feed mix into the upstream compartment of a travelling grate device to form a travelling bed of raw feed mix which extends through said upstream compartment into and through a downstream compartment of the travelling grate device and discharges into the inlet end of a rotary cement kiln, continuously introducing fuel and combustion air into the discharge end of the rotary kiln while discharging the combustion products into said downstream compartment of the travelling grate device above said bed at a temperature in the order of 950° C, recovering Portland cement clinker from said discharge end of the kiln, withdrawing the combustion products from said downstream section to cause at least substantially all of the combustion products entering said downstream section from said kiln to pass downwardly through said travelling bed to effect partial decarbonation of said raw feed mix in said downstream section, and then passing the withdrawn combustion products into said upstream section to pass downwardly through said travelling bed therein thereby to preheat the raw feed mix, the improvement which comprises:

(a) increasing the continuous feed of raw feed mix to said upstream section whereby to increase the throughput of said kiln;

(b) decreasing the volume of gas passing through said kiln whereby the amount of dust passing into said downstream section is reduced; and

(c) increasing the temperature in said downstream section over said bed by an amount of about 70–100° C to effect a sufficient increase in said decarbonation in said downstream section whereby to recover said Portland cement clinker from said discharge end of the kiln despite the increase in throughput of step (a), said increase in temperature being effected by incinerating refuse on top of said travelling bed within said downstream section of the travelling grate device.

4,089,698

PROCESS FOR HANDLING ASPHALTENE CONCENTRATES

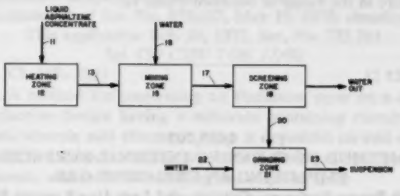
Luke W. Corbett, Mountainside, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Nov. 12, 1973, Ser. No. 414,776

Int. Cl.[2] C08L 95/00

U.S. Cl. 106—278 5 Claims

1. A process for preparing a stable aqueous suspension of an asphaltene concentrate, said concentrate having a melting point higher than 300° F and comprising a mixture of from 40 to 90% by weight of heptane-insoluble asphaltenes and from 10 to 60% by weight of polar aromatics, said concentrate having been obtained as a liquid phase by treatment of an asphaltic residuum with a C_3 to C_8 paraffinic hydrocarbon at elevated temperatures and pressures, which comprises conducting the asphaltene concentrate in liquid state into a moving stream of



water, thereby causing the liquid asphaltene concentrate to solidify in the form of particulate lumps or strings, and grinding a mixture of the particulate solids and water into the form of a paste-like suspension.

4,089,699

PIGMENT PREPARATION

John Bryce Blackburn, Beith, Scotland, and Arnold William Field, Ruabon, Wrexham, Wales, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 21, 1975, Ser. No. 624,356

Claims priority, application United Kingdom, Oct. 26, 1974, 46407/74; Jul. 18, 1975, 30160/75

Int. Cl.[2] C08J 3/20

U.S. Cl. 106—308 Q 10 Claims

1. A pigment composition comprising pigment having deposited thereon at least 5% by weight based on the weight of composition of a complex formed from one or more non ionic polyether surfactants based on ethylene oxide and a polymeric carboxylic acid having a molecular weight of at least 1500.

4,089,700

PROCESS FOR THE PREPARATION OF OPAQUE ORGANIC PIGMENTS

Horst Brandt, Odenthal; Reinhold Hornle, Cologne; Karlheinz Wolf, and Hans-Heinz Molls, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 10, 1976, Ser. No. 684,649

Claims priority, application Germany, May 13, 1975, 2521249

Int. Cl.[2] C08J 3/00

U.S. Cl. 106—309 6 Claims

1. In a process for converting a transparent pigment which provides a transparent color impression in binders into an opaque pigment which provides an opaque color impression in binders the improvement consisting essentially of adding to the prepared transparent pigment while moist a solvent comprising an azeotrope-forming agent capable of forming an azeotropic mixture with the liquid associated with the transparent pigment, distilling off said mixture at the azeotropic point thereof, stripping any excess solvent from the resultant product, and drying said product, whereby an opaque pigment in the form of a dry pigment powder which exhibits adequate flow properties in binders is obtained.

4,089,701

PROCESS FOR SOLIDIFYING MOLASSES

Junichi Shimizu, and Tatsuya Iwakura, both of Yokohama, Japan, assignors to Mitsui Sugar Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1977, Ser. No. 766,542

Claims priority, application Japan, Jul. 12, 1976, 51/81923; Feb. 7, 1976, 51/1246

Int. Cl.[2] C13F 3/00; A23K 1/02

U.S. Cl. 127—61 11 Claims

1. A process for solidifying molasses which comprises; pro-

viding a mixture of molasses and a composition selected from oils, fats and esters of higher fatty acids; and concentrating said mixture at a temperature of between 110° and 175° C in the presence of sufficient alkali to regulate the ph value of the mixture in the range of between 8 and 12.

4,089,702

METHOD OF CLEANING INTERNAL SURFACES EMPLOYING AN EXPLOSIVE GAS

Bertil Petrus Enoksson, Gyttorp, and Lars Uno Lennart Eriksson, Nora, both of Sweden, assignors to Nitro Nobel AB, Gyttorp, Sweden

Filed Jan. 27, 1977, Ser. No. 763,223
Claims priority, application Sweden, Dec. 20, 1974, 7416110
Int. Cl.² B08B *9/00*
U.S. Cl. 134—1 **5 Claims**

1. A method of loosening and removing particles from internal surfaces of an object to clean said surfaces, which object has a plurality of outlets leading to a chamber defined by said internal surfaces, said method comprising: closing off all but one of said outlets of said object with means for sealing off said all but one of said outlets and for unsealing said all but one of said outlets in response to pressure emanating from said chamber defined by said internal surfaces; conveying an explosive gas to said chamber via said one outlet which is not closed off; detonating said explosive gas so that said gas penetrates into the chamber and thereby loosens said particles, said step of detonating said explosive gas comprising creating a pressure within said chamber sufficient to break said means for sealing off said all but one of said outlets to thereby unseal said all but one of said outlets, whereby said thus exploded explosive gas is allowed to exhaust via said all but one of said outlets and carry with it loosened particles so that internal surfaces are cleaned.

4,089,703

HOT DETERGENT PROCESS

Nelson Stanley White, Shreveport, La., assignor to White Chemical Company, Inc., Shreveport, La.

Filed Dec. 23, 1976, Ser. No. 753,905
Int. Cl.² B08B *3/08, 9/02*
U.S. Cl. 134—22 C **6 Claims**

1. A hot detergent process for removing solid paraffin-containing material from surfaces which comprises contacting said paraffin-containing material with an aqueous solution (A) comprising,

alkali metal metasilicate — about 11–42% by weight
tri(alkali metal) phosphate — about 1–12% by weight
tetrasodium pyrophosphate — about 1–12% by weight
alkali metal hydroxide — about 2–22% by weight
tetrapotassium pyrophosphate — about 1–12% by weight
alkali metal hexametaphosphate — about 1–14% by weight
alkylphenol-ethylene oxide condensation product — about 7–34% by weight
ethylene glycol monobutyl ether — about 14–65% by weight
methyl cellulose ether stabilizer — about 1–67% by weight

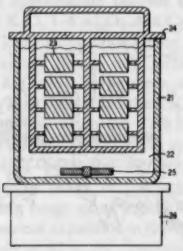
and then adding to solution (A) a solution (B) comprising concentrated sulfuric acid and a foam stabilizer, said solution (B) being added in amounts sufficient to initiate an exothermic reaction and to disperse said paraffin-containing material.

4,089,704

REMOVAL OF RTV SILICON RUBBER ENCAPSULANTS

John Herbert Heiss, Jr., Bethlehem, Pa., and John Robert Wylie, North Andover, Mass., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J. and Western Electric Company Inc., New York, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,098
Int. Cl.² H01L *23/30*
U.S. Cl. 134—29 **6 Claims**



6. In a process for fabricating circuits formed on an insulating substrate, the method of removing silicone rubber encapsulants comprising siloxanes with methoxy end groups formed on said circuit comprising the steps of:

immersing the circuit in a first solution consisting of tetramethylammonium hydroxide, methanol and 2-propanol with a concentration by volume of tetramethylammonium hydroxide and methanol to 2-propanol within the range 1:10 to 1:20 at a temperature within the range 36°–40° C for a period of time within the range 2–6 hours;

removing said circuit from said first solution and immersing in a second solution of the same composition at a temperature within the range 36°–40° C for a period of time within the range 1–2 hours in order to remove any residue remaining after immersion in said first solution; and

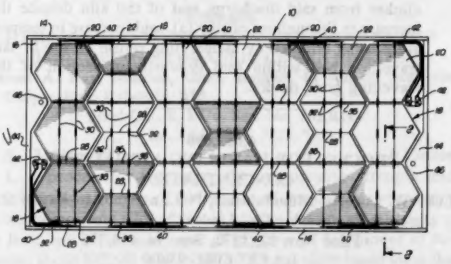
removing said circuit from said second solution and immersing in third and fourth solutions comprising isopropyl alcohol in order to rinse said circuit.

4,089,705

HEXAGON SOLAR POWER PANEL

Irwin Rubin, Oxnard, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 28, 1976, Ser. No. 709,415
Int. Cl.² H01L *31/04*
U.S. Cl. 136—89 P **5 Claims**



1. In a solar power panel:

(a) a support providing a surface for an array of solar cells;

(b) a plurality of solar cells mounted on said surface and arranged in side-by-side rows;

(c) first alternate rows of solar cells comprising a number of

correspondingly oriented cells of substantially hexagonal configuration with sides of adjacent cells being adjoining;

(d) second alternate rows of solar cells comprising a number of cells of substantially hourglass configuration complementing the substantially hexagonal configuration of the cells of said first alternate rows;

(e) terminal means mounted on said support;

(f) means electrically connecting said cells to each other and to said terminal means; and

(g) window means cooperable with said support for enclosing said cells;

(h) substantially all of said first and second alternate rows of solar cells terminating at opposite ends respectively along two common, substantially parallel spaced lines, thereby to more fully utilize the available panel support area.

4,089,706

METHOD OF PRODUCING FLINT

Hans Zeiringer, Kappel, Krappfeld, Austria, assignor to Treibacher Chemische Werke Aktiengesellschaft, Treibach, Austria

Filed Jul. 19, 1976, Ser. No. 706,826
Claims priority, application Austria, Jul. 21, 1975, 5636/75
Int. Cl.[2] B22D *25/00*; C22C *23/00*
U.S. Cl. 148—2 **5 Claims**

1. A method of producing flint from a melt of a pyrophoric alloy of rare earth metals and iron, which comprises the steps of casting the alloy melt into a mold, permitting the melt to cool in the mold, slowing the cooling as the solidification point of the melt is approached sufficiently to maintain the alloy melt at a temperature from 770° to 610° C for a period of at least ten minutes, subsequently extruding the alloy melt and subjecting the extrudate to a heat treatment at temperatures from 370° to 470° C for one half hour to four hours, the heat treatment being discontinued before the limit value of the thermodynamic equilibrium has been reached and the combined cooling and heat treatments being selected to attain a pyrophoric property of at least 90%, as defined herein.

4,089,707

METHOD OF IMPROVING CORROSION RESISTANCE OF LEAD AND LEAD ALLOY COATED METAL

Robert J. Shaffer, Richfield, and Vernon J. Schwering, Parma, both of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio

Filed Jul. 19, 1976, Ser. No. 706,776
Int. Cl.[2] C23F *7/00*
U.S. Cl. 148—6.14 R **2 Claims**

1. A method of improving the corrosion resistance of steel coated with lead or lead alloy consisting of the steps of treating the surface of the coated steel with an aqueous solution consisting essentially of water and hydrochloric acid.

4,089,708

PHOSPHATATION OF METALLIC SURFACES

Alexandre Askienazy, Paris; Victor Ken, Argenteuil, and Jean-Claude Souchet, Paris, all of France, assignors to Compagnie Francaise de Produits Industriels, Gennevilliers, France

Filed Apr. 8, 1976, Ser. No. 675,063
Claims priority, application France, Apr. 14, 1975, 75 11491
Int. Cl.[2] C23F *7/10*
U.S. Cl. 148—6.15 R **16 Claims**

1. The method of phosphatation of metallic surfaces selected from the group consisting of iron and steel, comprising the treatment of said surfaces with an aqueous phosphatation solution containing a phosphate of a member selected from the group consisting of sodium, potassium and ammonium and an effective quantity of tungstate ion accelerating agent, and having a pH value of 5.8 to 6.5.

4,089,709

METHOD FOR PASSIVATING ALUMINUM LAYERS ON SEMICONDUCTIVE DEVICES

James M. Harris, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Continuation of Ser. No. 578,617, May 19, 1975, abandoned.
This application Feb. 28, 1977, Ser. No. 772,714
Int. Cl.[2] C23F *7/06, 17/00*
U.S. Cl. 148—6.27 **12 Claims**

1. A method for passivating an aluminum layer on a semiconductive device having a substrate containing circuit elements wherein said aluminum layer is deposited on said semiconductive device to form an interconnect pattern for said elements, said method including the steps of:

oxidizing the surface of said aluminum layer to form an aluminum oxide layer thereon, said aluminum oxide layer being relatively thin with respect to the thickness of said aluminum layer;

coating said aluminum oxide layer with a surface active agent to form a hydrophobic surface on said aluminum oxide to inhibit nucleation and growth of AlOOH on said aluminum oxide layer; and

thereafter coating said semiconductor device with a deposited protective layer whereby a device of improved passivity is obtained.

4,089,710

PHOSPHATING METHOD WITH CONTROL IN RESPONSE TO CONDUCTIVITY CHANGE

Brian Alfred Cooke, Knotty Green, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Apr. 19, 1976, Ser. No. 678,439
Claims priority, application United Kingdom, Apr. 23, 1975, 16799/75
Int. Cl.[2] C23F *7/10*
U.S. Cl. 148—6.15 Z **6 Claims**

1. In a method of applying a zinc phosphate coating to a continuous metal surface or to a series of metal surfaces wherein

(1) a metal surface is treated with an acidic phosphating solution which comprises zinc, phosphate and alkali metal ions,

(2) the acidic phosphating solution is replenished as coating proceeds by additions of an acidic material (a) comprising zinc phosphate ions, and of an alkaline material (b) comprising alkali metal ions, and

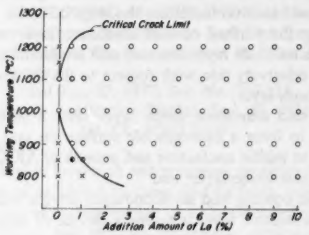
(3) the composition of the acidic phosphating solution when in the steady state is such that a consistent and satisfactory coating is produced on the metal surface, and can be maintained substantially constant, as coating proceeds, by additions of materials (a) and (b) in a definite ratio of addition rates,

the improvement which consists in commencing to treat a metal surface or metal surfaces in a phosphating solution which is already in said steady state, and thereafter making additions to the acidic phophating solution of materials (a) and (b) so as to maintain constant its electrolytic conductivity at a given temperature, the addition rates of (a) and (b) made in response to any change in conductivity being in the same said definite ratio.

4,089,711
ANTIFERROMAGNETIC CHROMIUM BASE INVAR-TYPE ALLOYS AND A METHOD OF PRODUCING THE SAME

Hideo Saito; Kazuaki Fukamichi; Yoshinobu Saito, and Sakae Sugimoto, all of Sendai, Japan, assignors to The Research Institute for Iron, Steel and Other Metals of the Tohoku University, Sendai, Japan

Filed Mar. 30, 1977, Ser. No. 782,906
Claims priority, application Japan, Apr. 3, 1976, 51-37656
Int. Cl.[2] C22C *28/00;* C22D *1/11*
U.S. Cl. 148—11.5 R 4 Claims

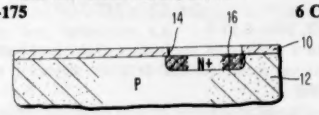


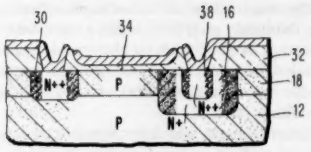
1. An antiferromagnetic chromium base Invar-type alloy consisting of 0.5–6% by weight of either iron or silicon or both, 1.5–6% by weight of either cobalt or manganese or both, 0.05–10% by weight of at least one rare earth element and remainder of chromium, said alloy having a reduction ratio of not less than 60% and a thermal expansion coefficient of 4×10^{-6}/° C.

4,089,712
EPITAXIAL PROCESS FOR THE FABRICATION OF A FIELD EFFECT TRANSISTOR HAVING IMPROVED THRESHOLD STABILITY

Richard C. Joy; Ingrid E. Magdo, both of Hopewell Junction, and Alfred Phillips, Jr., Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 615,251, Sep. 22, 1975, Pat. No. 4,028,717. This application May 17, 1977, Ser. No. 797,895
Int. Cl.[2] H01L *21/20, 29/78*
U.S. Cl. 148—175 6 Claims





1. A method for forming an improved field effect transistor comprising

forming a first masking layer on a mono-crystalline semiconductor body of a first conductivity type, forming at least a first opening in said first layer to define at least the drain region,

introducing a second conductivity type impurity into said body through the opening defining the drain region,

removing the masking layer,

growing an epitaxial semiconductor layer embodying a background impurity of a first conductivity type on said body, whereby said impurity from said drain region outdiffuses into and substantially through said epitaxial layer so as to form a reverse gradient second conductivity type region in said epitaxial layer,

forming a second masking layer on the resultant epitaxial semiconductor layer,

forming a second opening in said second layer that is located within the confines of said outdiffused region defining said drain region, and a third opening in spaced relation to said drain region to define an opening for a source region,

introducing a second type impurity into said epitaxial layer through said second and third openings in said second masking layer,

forming source and drain electrodes in ohmic contact to the source and drain regions, and a gate electrode over the region between said source and drain regions.

4,089,713
DIFFUSION OF DONORS INTO (Hg Cd) Te THROUGH USE OF Ga-Al ALLOY

Eric Shanks Johnson, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 6, 1977, Ser. No. 757,268
Int. Cl.[2] H01L *21/208*
U.S. Cl. 148—178 15 Claims

1. The method of adjusting the donor concentration in a body of mercury cadmium telluride, comprising the steps of:

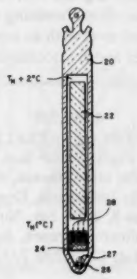
contacting a body of mercury cadmium telluride with a quantity of a donor material selected from the group consisting of gallium and gallium alloys containing up to 5% by weight of a metal selected from the group consisting of aluminum, tin and cadmium; and

heating said body at a temperature of at least 150° C for a sufficient time to diffuse said donor material within said body.

4,089,714
DOPING MERCURY CADMIUM TELLURIDE WITH ALUMINUM OR SILICON

Eric Shanks Johnson, and Joseph Lawrence Schmit, both of Minnetonka, Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 6, 1977, Ser. No. 757,269
Int. Cl.[2] H01L *21/225*
U.S. Cl. 148—188 17 Claims



1. A method of adjusting the donor concentration in a body of mercury cadmium telluride, comprising the steps of:

contacting a body of mercury cadmium telluride with a quantity of donor material selected from the group consisting of aluminum and silicon; and

heating said body at a temperature of at least 550° C for a

sufficient time to distribute said donor material within said body.

4,089,715

EXPLOSIVE GRADE ALUMINUM POWDER

Rudolf Scherzinger, Johannesburg, South Africa, assignor to Metal Sales Company (Proprietary) Limited, Benoni, South Africa

Continuation of Ser. No. 494,311, Aug. 2, 1974, abandoned. This application Apr. 22, 1976, Ser. No. 679,461

Claims priority, application South Africa, Sep. 5, 1973, 73/236092

Int. Cl.[2] C06B *45/32*

U.S. Cl. 149—6 1 Claim

1. A flowable explosive grade aluminum composition comprising an admixture of:

(1) aluminum powder having a particle size distributed between 850 microns and submicron size, said powder admixed with,

(2) aluminum granules as a carrier for said aluminum powder and

(3) a coating agent of an oil soluble basic dyestuff dispersed over the carrier particles in an approximately single molecule thick layer, to adhere the aluminum powder to the carrier, the resulting composition having at least part of said aluminum powder adhered thereto such that the composition has:

(a) a bulk density of the order of 0.7–1.4,

(b) carrier particles with aluminum particles of less than approximately 40 microns in size adhered thereto,

(c) aluminum particles larger in size than approximately 40 microns,

(d) and aluminum particles of approximately 40 microns and smaller in size adhered to aluminum particles of larger size,

the resulting composition being flowable.

4,089,716

IGNITION ENHANCING PROPELLANT COATINGS

Terrence P. Goddard, Aptos; Donald N. Thatcher, Hollister, and Charles G. Garrison, San Jose, all of Calif., assignors to Teledyne McCormick-Selph, an operating division of Teledyne Industries, Inc., Hollister, Calif.

Filed May 10, 1977, Ser. No. 795,477

Int. Cl.[2] C06B *45/28*

U.S. Cl. 149—10 23 Claims

1. A process for incorporating an ignition compound comprised of certain dechydrodecaborate compounds directly upon exterior surfaces of uncoated nitrocellulose-based propellant grains, through the steps of:

(A) wetting uncoated, loose propellant grains on their exterior surfaces with a coating fluid having a solvating effect on said grains, the coating fluid being in the range of approximately 0.010 to 0.100 milliliters of fluid per gram of propellant,

(B) introducing a layer of decahydrodecaborate compound onto the exterior surfaces of said grains as the result of the wetting effect of said coating fluid, wherein said compound is in the range of approximately 0.1 to 4.0% of the total propellant weight, wherein said compound further includes a salt selected from the class of salts having the common anion $B_{10}H_{10}^{-2}$, and a cation selected from the group consisting of:

(i) ammonium, wherein the salt has the formula $(NH_4)_2B_{10}H_{10}$;

(ii) hydrazinium, wherein the salt has the general formula $(NH_2NH_3)B_{10}H_{10}$;

(iii) metal ions derived from the elements in Groups 1, 2, 8, 3*b*, 4*b*, 5*b*, 6*b*, 7*b*, and the elements of Groups 3*a*, 4*a*, 5*a*, and 6*a* which have atomic numbers respectively greater than 5, 14, 33 and 52; and,

(C) drying the thusly coated propellant grains until the exterior surface of each grain presents a dry appearance.

4,089,717

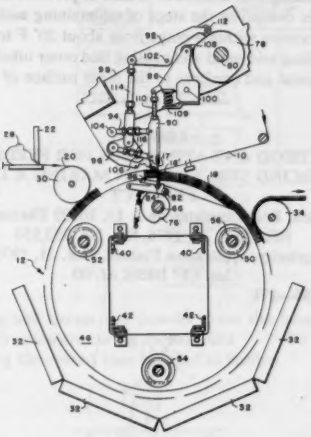
METHOD AND APPARATUS TO PRODUCE A TEXTILE PRODUCT

Robert C. Fay, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Mar. 29, 1974, Ser. No. 455,982

Int. Cl.[2] A46D *1/00*; D04H *11/08*

U.S. Cl. 156—72 4 Claims



1. A method of producing a textile fabric on a machine having an upper movable blade and a lower set of movable blades comprising the steps of: providing a supply of yarn, moving one of the lower blades upwardly, maintaining the lower edge of the upper blade substantially parallel to the upper edge of the lower blade while moving the upper movable blade downward in a curved angular path against the yarn and bending the yarn over the upwardly moved lower blade, moving the next adjacent lower blade upwardly against the yarn and bending the yarn over the upper blade to form a loop therein, supplying a backing sheet and adhering the formed yarn loop to the backing sheet.

4,089,718

PROCESS FOR MAKING THERMOPLASTIC ELASTOMERIC ARTICLES

Louis J. Triolo, Hasbrouck Heights, and Donald F. Morgan, Bloomingdale, both of N.J., assignors to Amerace Corporation, New York, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,697

Int. Cl.[2] B29H *15/04*

U.S. Cl. 156—122 8 Claims

1. A process for producing a useful thermoplastic, elastomeric article such as, for example, a semi-pneumatic tire, said process comprising the steps of:

a. forming a molding composition consisting essentially of:

i. a vulcanizable EPDM elastomeric terpolymer in an amount within the range of from about 25% to about 28% by weight of the total composition;

ii. an inert filler free from polyolefins in an amount within the range of from about 52% to about 56% by weight of the total composition, said filler comprising a blend of different filler materials; and

iii. the remainder of said composition being made up of plasticizers and processing aids;

b. extruding said molding composition into a tubular form;

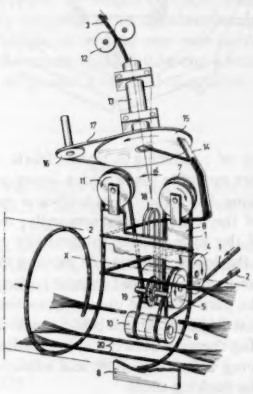
c. shaping said tubularly formed composition into an unmolded article of a predetermined shape;
d. maintaining said unmolded article of predetermined shape at a temperature within a range from about 270° F to about 300° F to facilitate molding;
e. introducing said unmolded article at said temperature to facilitate molding, into a mold; and
f. molding said unmolded article of predetermined shape free from vulcanization at a temperature substantially below said temperature of said unmolded article into said useful thermoplastic, elastomeric article and wherein the step (f) of molding said unmolded article of predetermined shape further comprises the steps of maintaining said mold at a temperature within a range from about 50° F to about 70° F, sealing said mold and causing said outer tubular portion to expand and conform to the inner surface of said mold.

4,089,719

METHOD AND APPARATUS FOR FEEDING REINFORCING STRAND WHEN MAKING A TUBULAR PRODUCT

Olof Sundell, Prastangsgatan 5a A 13, 10600 Ekenas, Finland

Filed Dec. 23, 1976, Ser. No. 753,953
Claims priority, application Finland, Dec. 31, 1975, 753754
Int. Cl.[2] B65H *81/00*
U.S. Cl. 156—171 **19 Claims**



1. A method for forming a continuous tape comprising at least two longitudinal strands and transverse cut strands and for applying the tape onto the surface of a tube blank which is continuously rotated and simultaneously moved longitudinally, comprising:
continuously feeding at least two first strands transversely towards the tube blank,
continuously winding consecutive loops of a second strand around said first strand, and
cutting one side of each loop while the other side of the loop is supported between said first strands and the tube blank.

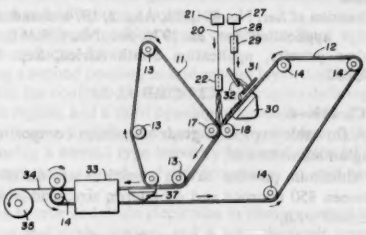
6. An apparatus for forming a continuous tape comprising at least two longitudinal strands and transverse cut strands and for applying the tape onto the surface of a tube blank which is continuously rotated and simultaneously moved longitudinally, comprising:
means for feeding continuously at least two first strands transversely towards the tube blank,
means for feeding and winding continuously a second strand in consecutive loops around said first strands, and
means for cutting one side of each loop while the other side of the loop is supported between said first strands and the tube blank.

4,089,720

METHOD AND APPARATUS FOR MAKING A NONWOVEN FABRIC

David J. Haley, Durham, N.C., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 28, 1975, Ser. No. 636,267
Int. Cl.[2] D04H *3/05;* D01G *25/00*
U.S. Cl. 156—181 **3 Claims**



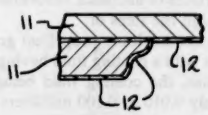
1. The method of making a nonwoven fabric having uniform strength and stretch in two directions, comprising the steps:
a. projecting a first group of filaments in a longitudinal direction in the nip of a pair of nipped rolls and moving collecting surfaces in such a manner that the filaments fold into and are captured and held by the nip with spans of the filaments lying in the plane of the nip, so that said filaments will lie in positions predominantly transverse to said fabric;
b. projecting a second group of filaments in a longitudinal direction onto an impact surface positioned at a location spaced from said nip, said second group of filaments being withdrawn from the impact surface by the moving collection surface and carried by said collection surface into contact with said first group of filaments to form a nonwoven fabric, wherein said second group of filaments will extend longitudinally along said fabric; and
c. bonding the filaments in said fabric to each other.

4,089,721

METHOD OF MAKING A LAMINATE

Myrl D. Sauder, Archbold, Ohio, assignor to Sauder Woodworking Co., Archbold, Ohio

Filed Mar. 24, 1977, Ser. No. 780,765
Int. Cl.[2] B32B *3/04;* B29C *17/04;* 428 *192;511;537;161;165;121*
U.S. Cl. 156—212 **9 Claims**



1. The method of making laminated furniture products comprising:
providing a rigid wood product substrate having plural planar surfaces, at least two of said planar surfaces intersecting at a substantially right angle forming a sharp corner thereof,
placing a sheet of substantially organic laminate material over one planar surface of said substrate, a free portion of said laminate sheet extending beyond said sharp corner of the substrate,
said organic laminate comprising a first lamina of a thermoformable, thermoplastic material and a second lamina of a thermosetting material bonded to said first lamina, said first lamina thereof being placed nearest the one planar surface of the substrate,

a thermally reactive adhesive being interposed between the laminate and the substrate,

heating the substrate and laminate to elevated temperature, and

applying pressure to the heated laminate to

bond the laminate to the one planar surface, and then to

bend the laminate free portion by degrees tightly around said sharp corner and into intimate adhesively-bonded contact on another planar surface of the substrate adjacent said corner.

4,089,722

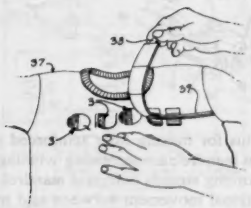
METHOD OF AFFIXING HEAT TRANSFERRABLE INDICIA TO A FABRIC SURFACE

Verne Richard Holoubek, Ixonia, Wis., assignor to Holoubek Studios, Inc., Butler, Wis.

Filed Sep. 23, 1976, Ser. No. 725,974

Int. Cl.² B44C *1/10*; B32B *3/16*

U.S. Cl. 156—235 **8 Claims**



1. A method of permanently affixing heat transferrable indicia to a fabric surface employing a heat source and a heat transfer including a carrier sheet having a plurality of spaced separation markings defining detachable subsections each having a plurality of alignment markings defining first and second spaced guide axii each intersecting a side edge of said defined subsection and a first side containing a heat releasable indicia positioned at a predetermined location on said carrier sheet relative to said first and second guide axii, comprising the steps of removing a plurality of selected subsections from the remainder of said sheet by severing along a line defined by said separation markings immediately adjacent said selected subsections, placing said first sides of said removed subsections immediately adjacent said fabric surface, axially aligning a selected guide axis of a selected subsection with a selected guide axis of an adjacent selected subsection, selectively applying heat to said indicia and transferring said indicia from said selected aligned subsections to said fabric surface and permanently bonding said transferred indicia while aligned to said fabric surface, and removing said carrier sheets of said selected subsections from said fabric surface with said transferred indicia separated from said carrier sheets and permanently bonded to said fabric surface in correlated alignment.

4,089,723

SIMULATED TEXTURED METAL AND METHOD OF PRODUCTION

Miriam D. Williams, 2 Racebrook Road, West Hartford, Conn. 06107

Filed Feb. 19, 1976, Ser. No. 659,224

Int. Cl.² B05D *5/00, 1/36*

U.S. Cl. 156—246 **15 Claims**

1. A method for the production of a textured surface on at least a portion of a substrate comprising the steps of:

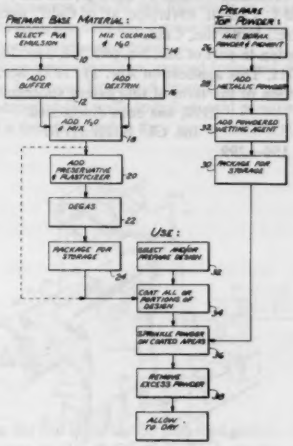
preparing an aqueous solution of dextrin;

mixing a polyvinyl acetate emulsion with the dextrin solution to form an acidic liquid base material, the polyvinyl acetate emulsion being characterized by borax incompatibility;

preparing an alkaline top powder by mixing borax and a metallic powder;

coating at least a portion of a substrate with the liquid base material;

dusting the liquid base material coating with the top powder;



removing any excess top powder from the base material prior to complete curing thereof; and

permitting the coated base material to harden.

4,089,724

COMPOSITE TEXTURED PRODUCTS AND THEIR MANUFACTURE

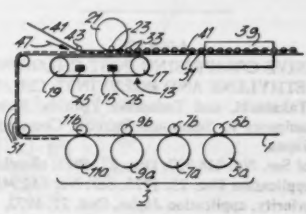
René F. Bomboire, Wiltz, Luxembourg, assignor to Eurofloor S.A., Wiltz, Luxembourg

Division of Ser. No. 448,451, Mar. 5, 1974, Pat. No. 4,017,658. This application Apr. 14, 1976, Ser. No. 676,690

Claims priority, application Luxembourg, Nov. 21, 1973, 68838

Int. Cl.² B32B *3/10*

U.S. Cl. 156—277 **5 Claims**



1. A process for the manufacture of sheet material having a textured surface comprising the steps of:

providing a decoration on a dimensionally stable support;

forming a continuous wear layer over the printed decoration;

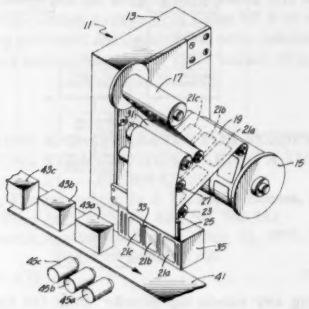
applying at least one discontinuous layer of a transparent plastisol of at least 10 mils thickness over the wear layer in registration with at least a part of the printed decoration; and

passing the printed support which bears the wear layer and the discontinuous plastisol through a gelation oven to cause gelation of the plastisol.

4,089,725
APPARATUS AND METHOD FOR TRANSMITTING ELEMENTS TO ARTICLES

Michael Crankshaw, Santa Fe Springs; Leo Kucheck, Irvine, and Donald L. Caudill, Riverside, all of Calif., assignors to Label-Aire Inc., Fullerton, Calif.

Continuation-in-part of Ser. No. 699,264, Jun. 24, 1976, Pat. No. 4,024,011. This application Apr. 11, 1977, Ser. No. 786,186
The portion of the term of this patent subsequent to May 17, 1994, has been disclaimed.
Int. Cl.[2] B32B *31/10*
U.S. Cl. 156—299 17 Claims



1. An apparatus for transferring elements to articles which are moved in a first direction through a station, said apparatus comprising:

means for releasably retaining first and second of the elements at first and second positions with said positions defining a row at said station, the axis of the row extending generally in said first direction and the first position being downstream, in the direction of article movement, of said second position;

means for transferring the first and second elements from the retaining means to first and second of the articles, respectively, as the first and second articles are moved through said station; and

control means for controlling said transferring means so that said transferring means initiates transfer of the first element to the first article before initiating transfer of the second element to the second article.

4,089,726
ADHESIVE COMPRISING POST-CHLORINATED POLYETHYLENE AND POLYVINYL CHLORIDE

Ko Ishii, Takatsuki, and Tadamasa Yoshida, Kobe, both of Japan, assignors to Sumitomo Bakelite Company, Limited, Tokyo, Japan

Division of Ser. No. 428,997, Dec. 27, 1973, abandoned. This application Dec. 22, 1975, Ser. No. 642,945
Claims priority, application Japan, Dec. 27, 1972, 47-129989; Dec. 27, 1972, 47-129990; Dec. 27, 1972, 47-129991; Dec. 22, 1972, 47-129992
Int. Cl.[2] B32B *27/06*
U.S. Cl. 156—306 8 Claims

1. A method of adhering a thermoplastic resin and an olefinic polymer which comprises pressing under heating a thermoplastic resin comprising

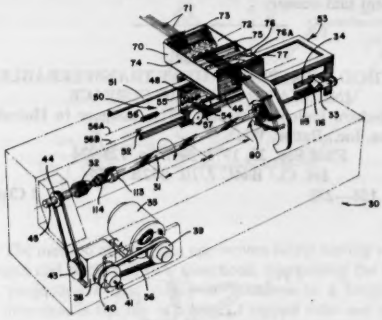
(a) 2 to 50 parts by weight of post-chlorinated polyethylene having a specific gravity of 1.00 to 1.35 and a chlorine content of 5 to 50% and a mean molecular weight of from about 20,000 to 200,000

(b) 100 parts by weight of polyvinyl chloride having a mean degree of polymerization from about 300 to 2,500, and said olefinic polymer.

4,089,727
APPARATUS FOR MAKING FIBER REINFORCED PLASTIC MEMBERS

Philippe Hardy-Thé McLain, Columbia, S.C., assignor to Shakespeare Company, Columbia, S.C.

Filed Sep. 7, 1976, Ser. No. 720,907
Int. Cl.[2] B31C *9/00*; B32B *31/12*; B65H *81/00*; G05G *15/00*
U.S. Cl. 156—350 9 Claims



1. Apparatus for making fiber reinforced plastic members comprising: a mandrel; a nonrotating winding head by which to feed reinforcing strands onto said mandrel; means to effect relative rotational movement between said mandrel and said winding head; means to effect relative longitudinal movement between said mandrel and said winding head in directions parallel to said mandrel such means involving the linear displacement of at least one of the structures comprising said winding head and said mandrel; and means selectively to vary the rate of at least one of the relative movements between said mandrel and said winding head while reinforcing strands are being fed in discrete layers onto said mandrel in response to variations in both the diameter of said mandrel, and the desired angle in which said reinforcing strands are to be fed onto said mandrel.

4,089,728
WORKPIECE MONITORING AND CONTROL APPARATUS FOR A MACHINE HAVING A SEQUENTIAL FLOW OF WORKPIECES

Richard K. Teed, Greenwood, S.C., assignor to Riegel Textile Corporation, New York, N.Y.

Filed May 17, 1976, Ser. No. 687,000
Int. Cl.[2] B65C *9/40*
U.S. Cl. 156—352 12 Claims

1. Workpiece monitoring and control apparatus for a machine having a desired predetermined sequential flow of equally spaced-apart workpieces therein and being characterized by continually monitoring both the presence and absence of workpieces in such flow and operating control mechanisms for such machine, such as stopping operation of the machine or actuating a signaling device, in the event of an undesired absence or presence of a workpiece; said monitoring and control apparatus comprising:

electrically-operated machine control means;

sensing means positioned in the sequential flow of the equally spaced-apart workpieces for sensing the passage of workpieces and for sensing the absence of workpieces in such flow;

a source of electrical energy;

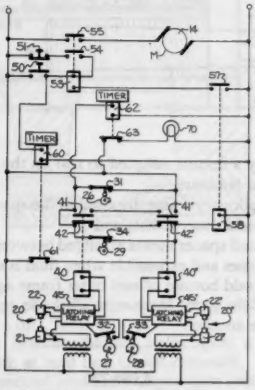
an electrical circuit connected between said source of electrical energy and said electrically-operated control means for effecting the flow of electrical energy therebetween and connected with said sensing means;

first timer-operated switch means in said circuit comprising a normally closed switch for maintaining the flow of

electrical energy therethrough and to said control means, and timer means for momentarily opening said switch during first predetermined timed periods;

second timer-operated switch means in said circuit comprising a normally closed switch connected in series with said first timer-operated switch means for maintaining the flow of electrical energy therethrough and to said control means, and timer means for momentarily opening said second switch during second predetermined timed periods different from the first timed periods; and

relay-operated switch means including a relay connected with and being responsive to said sensing means, a first switch connected in said circuit in parallel with said first timer-operated switch for being closed by said relay in response to the sensing of a workpiece in the desired position in the sequential flow by said sensing means for maintaining the flow of electrical energy therethrough



and to said control means for the timed periods during which said first timer means momentarily opens said first timer-operated switch, and a second switch connected in said circuit in parallel with said second timer-operated switch for being closed by said relay in response to sensing of the absence of a workpiece between the desired positions in the sequential flow by said sensing means for maintaining the flow of electrical energy therethrough and to said control means for the timed periods during which said second timer means momentarily opens said second timer-operated switch;

whereby, in the event of an undesired absence or undesired presence of a workpiece in the sequential flow, either said first or second relay-operated switches will not be closed during the respective opening of said first and second timer-operated switch means to stop the flow of electrical energy to said control means.

4,089,729

APPARATUS FOR MANUFACTURING PLASTIC BAGS IN A CONTINUOUS WAY

Arnoldus Willem Jan Leloux, Dedemsvaart, Netherlands, assignor to Wavin B.V., Netherlands

Division of Ser. No. 640,133, Dec. 12, 1975, Pat. No. 4,030,956, which is a continuation-in-part of Ser. No. 337,493, Mar. 2, 1973, abandoned. This application Mar. 11, 1977, Ser. No. 776,795

Claims priority, application Netherlands, Mar. 15, 1972, 7203390

Int. Cl.[2] B32B *31/00*; B31F *5/00*

U.S. Cl. 156—498 **8 Claims**

1. An apparatus for manufacturing plastic bags from a length of thermoplastic tubular foil having two superposed walls, comprising:

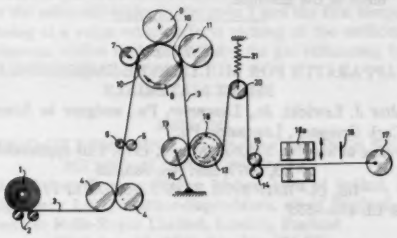
a rotatable drum for supporting the foil,

a heating element carried by and exposed on the surface of said drum, said heating element being parallel to the axis of rotation of said drum,

a pair of rotating feed rollers, spaced from said drum, for feeding the thermoplastic foil to the surface of said drum,

means for maintaining one of the foil walls in engagement with said heating element and for maintaining the two foil walls in contact with each other,

a pair of rotating pressure rollers, spaced from said drum, for moving the foil away from said drum and for pressing the heated superposed foil walls together, said pressure rollers rotating at a speed such that they move the foil at a speed



slower than the foil is moved by said feed rollers, whereby the foil moves to the surface of said drum in an untensioned condition,

said pressure rollers being movable away from each other to provide a gap between them through which the foil can be slipped, and

means for drawing the foil through the gap between said pressure rollers when the latter are moved apart to take up the slack foil between said feed and pressure rollers which occurs due to the fact that said feed rollers move the film faster than said pressure rollers.

4,089,730

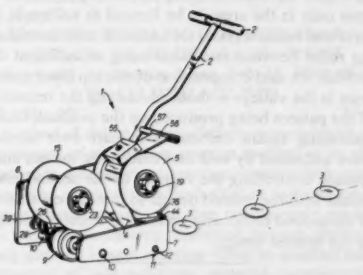
AISLE MARKER APPLICATING MACHINE

Günther Hans Mahn, Brookfield, Wis., assignor to W. H. Brady Co., Milwaukee, Wis.

Filed Apr. 11, 1977, Ser. No. 786,539

Int. Cl.[2] B44C *1/10, 7/06*

U.S. Cl. 156—541 **6 Claims**



1. In a floor marker applicating machine of the type adapted to transport a liner carrying closely spaced pressure sensitive adhesive markers from a supply roll thereof to a take-up reel and including (a) a housing, (b) rotatable elements on which the machine is moved along a floor, and (c) drive means driven by one of the rotatable elements and adapted for intermittent transport of the liner from the supply reel to the take-up reel, during which transport a marker is dispensed from the liner onto a floor surface when the liner passes about a stripper edge positioned between the two reels,

the improvement wherein:

(1) a foot lever is attached to a shaft pivotally mounted in the

housing and includes a portion extending beyond the rear of the machine,

(2) a first element of the drive means is associated with a shaft rotated upon movement of the machine and a second element of the drive means is carried on the foot lever; and

(3) the foot lever is pivotable between a first position wherein the first drive element and second drive element are interconnected for intermittent transport of the liner through the machine and a second position in which the first and second drive elements are disconnected from one another so that the liner remains stationary upon movement of the machine.

4,089,731

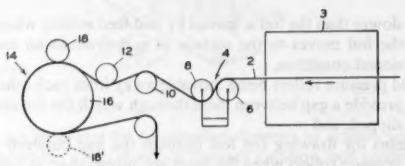
APPARATUS FOR MULTILEVEL EMBOSSING OF SHEET MATERIALS

Walter J. Lewicki, Jr., Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Division of Ser. No. 574,860, May 6, 1975. This application Feb. 3, 1977, Ser. No. 765,225

Int. Cl.² B31F *5/00;* B32B *31/00;* A01J *21/00*

U.S. Cl. 156—555 **1 Claim**



1. Apparatus for embossing a web of material having a foamed resin layer with an overlying top layer of substantially impervious resin material, said web having a printed design thereon, the apparatus comprising:

(a) a first embossing roll means engaging the impervious resin material to provide a surface texturing thereto to the whole surface of the web,

(b) a second embossing means comprising a pair of rollers cooperating to provide an embossing nip, at least one of the rollers having embossing lands projecting at the periphery of the roller to compress the top layer and foamed resin only in the areas to be formed as valleys in said top layer and foamed resin, the recessed areas in said embossing roller between said lands being of sufficient depth to provide for said compression of the top layer and foamed resin in the valleys without contacting the remaining area of the pattern being produced on the product, said second embossing means embossing in part over areas which were embossed by said first embossing means, and

(c) means controlling the registry of the second embossing means with the printed design so that the embossing lands of the second embossing means is in registry with portions of the printed design.

4,089,732

INSTALLATIONS FOR THE MANUFACTURE OF BEAMS COMPOSED OF GLUED LAMINAE

Andre Jean Gerard Ghesquier, 41, avenue des Fenots, 28100 - Dreux, France (21800)

Filed May 24, 1976, Ser. No. 689,380

Claims priority, application France, May 27, 1975, 75 16448; May 27, 1975, 75 16449

Int. Cl.² B30B *1/30, 1/38, 7/04*

U.S. Cl. 156—580 **8 Claims**

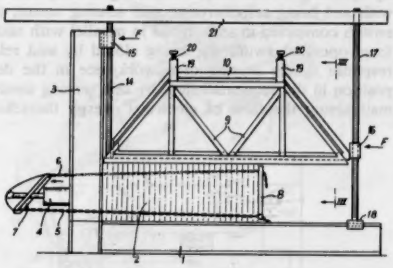
1. A press for use in an installation for the manufacture of beams made of glued laminae comprising

vertical upright means having first and second sides;

vertical pressure plate means disposed on said first side of said upright means;

jack means abutting said second side of said upright means and having linking means removably attached to said pressure plate means, said jack means being operable to pull said pressure plate means toward said upright means for pressing glued laminae therebetween;

an outer vertically movable frame having a U-shaped configuration in cross section defining spaced vertical sides



joined by a bottom adapted to rest on the upper edges of the glued laminae;

an inner stationary frame disposed in the space between said sides of said outer frame; and

fluid operated spacer means arranged between said inner and outer frames and expansible when fluid is supplied thereto to force said bottom of said outer frame against the upper edges of the glued laminae to align the upper edges flush with one another.

4,089,733

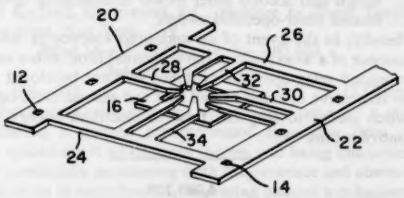
METHOD OF FORMING COMPLEX SHAPED METAL-PLASTIC COMPOSITE LEAD FRAMES FOR IC PACKAGING

Richard Henry Zimmerman, Palmyra, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 612,889, Sep. 12, 1975, abandoned. This application Feb. 25, 1977, Ser. No. 772,205

Int. Cl.² B44C *1/22;* C03C *15/00, 25/06;* C23F *1/02*

U.S. Cl. 156—630 **5 Claims**



1. A method of producing a metal-plastic composite lead frame device for integrated circuit packaging, said lead frame device having a plurality of cantilever metal leads held in fixed alignment near their free ends by a member of plastics material, comprising the steps of:

perforating a continuous web of metallic foil with a plurality accurately spaced registration apertures along at least one marginal edge thereof;

depositing on a first side of said foil a pattern of thin, electrically insulating plastic material accurately aligned with respect to said apertures, said pattern having lesser overall dimensions than said web;

coating the opposite side of said foil with a photo resist material;

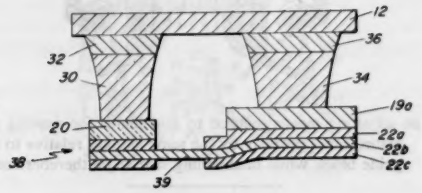
imaging a lead frame pattern on said photo resist at accurately aligned positions with respect to said apertures;
developing said imaged lead frame pattern; and
passing said strip through an etching bath whereby said strip will be etched away leaving only a lead frame with the leads supported by said plastics material.

4,089,734

INTEGRATED CIRCUIT FUSING TECHNIQUE

Robert W. Bierig, Sudbury, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 506,159, Sep. 16, 1974, abandoned, which is a division of Ser. No. 733,743, Oct. 18, 1976, Pat. No. 4,032,949, which is a continuation of Ser. No. 577,805, May 15, 1975, abandoned, which is a continuation of Ser. No. 435,612, Jan. 22, 1974, abandoned. This application Feb. 3, 1977, Ser. No. 765,496
Int. Cl.[2] C23F *1/02*
U.S. Cl. 156—656 8 Claims



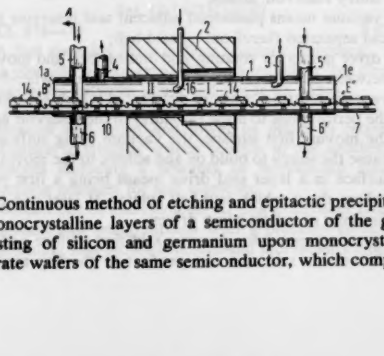
1. The method of producing an integrated circuit fuse comprising the steps of:
depositing a first conductive layer upon a substrate in contact with at least two circuit elements;
depositing a second conductive layer upon said first conductive layer coextensive with said first conductive layer, said second conductive layer comprising a material different from the material of said first conductive layer; and
removing a portion of said first layer between said substrate and said second conductive layer to form a fusible link from portions of said second conductive layer having planar surfaces and a uniform cross section, said portion extending across said first conductive layer.

4,089,735

METHOD FOR EPITACTIC PRECIPITATION OF CRYSTALLINE MATERIAL FROM A GASEOUS PHASE, PARTICULARLY FOR SEMICONDUCTORS

Erhard Sussmann, Poing, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation of Ser. No. 164,897, Jul. 21, 1971, abandoned, which is a continuation of Ser. No. 830,759, Jun. 5, 1969, abandoned. This application May 2, 1973, Ser. No. 356,408
Claims priority, application Germany, Jun. 5, 1968, 1769520
Int. Cl.[2] H01L *21/205, 21/306*
U.S. Cl. 156—612 2 Claims



1. Continuous method of etching and epitactic precipitation of monocrystalline layers of a semiconductor of the group consisting of silicon and germanium upon monocrystalline substrate wafers of the same semiconductor, which comprises placing monocrystalline substrates upon movable carriers of inert material, continuously passing said carriers through a tubular reaction vessel having an inlet point at one end and an outlet point at the other end, heating said carriers with said substrate wafers in the reaction vessel first through a zone II of a first, higher temperature and immediately thereafter through an adjacent zone I of a second, lower temperature, while introducing into the reaction vessel countercurrent to the movement of the substrate wafers a gas consisting of the halide of the semiconductor to be precipitated and hydrogen, the second temperature being at a value which effects epitactic precipitation from the gas of monocrystalline layers of the semiconductor on the substrate wafer in the zone I and the first temperature being at a value which effects etching of the surfaces of the substrate wafers in the zone II by the gas exhausting from the zone I through the zone II.

4,089,736

METHOD OF REMOVING AL-CR-CO COATINGS FROM NICKEL ALLOY SUBSTRATES

Maurice Fisher; Terence Walter Maber, both of Bristol, and Colin Garry Lilly, Weston-Super-Mare, all of England, assignors to Rolls-Royce Limited, London, England

Filed Apr. 11, 1977, Ser. No. 786,555
Claims priority, application United Kingdom, Apr. 27, 1976, 16976/76
Int. Cl.[2] C23F *1/00*
U.S. Cl. 156—665 5 Claims

1. A method of removing a coating from a substrate, said coating containing aluminium and chromium in combination with cobalt, said substrate being a nickel base alloy, said method comprising immersing said coated substrate in a solution containing the following constituents (by weight):
Ferric Sulphate; 6–14%
Hydrochloric Acid; 3.5–11%
Water; Remainder
until substantially all of the coating has been dissolved and then removing the substrate from the solution.

4,089,737

DELIGNIFICATION OF CELLULOSIC MATERIAL WITH AN ALKALINE AQUEOUS MEDIUM CONTAINING OXYGEN DISSOLVED THEREIN

Tadashi Nagano, Tokyo; Saisei Miyao, and Katsuhiko Takeda, both of Kure, all of Japan, assignors to Toyo Pulp Company, Ltd., Japan

Continuation of Ser. No. 511,474, Oct. 1, 1974, abandoned. This application Aug. 30, 1976, Ser. No. 718,935
Claims priority, application Japan, Feb. 18, 1974, 49-19287
Int. Cl.[2] D21C *3/02, 9/00*
U.S. Cl. 162—19 13 Claims

1. A method of delignifying cellulosic material with oxygen in the presence of an alkaline aqueous medium at an elevated temperature in a pressurized reaction vessel which comprises first dissolving oxygen into a fresh alkaline aqueous medium in an oxygen dissolving tank, and then continuously passing said alkaline medium containing dissolved oxygen through said cellulosic material in said reaction vessel to conduct oxidative delignification of said cellulosic material, continuously discharging a waste liquor formed during delignification from the vessel while continuously charging the fresh alkaline aqueous medium containing dissolved oxygen into the vessel, the consistency of said cellulosic material during delignification being such as to form an agglomeration of the cellulosic material and the alkaline aqueous medium in the form of a layer without any gaseous space therein, such consistency of the cellulosic material being kept substantially constant by controlling the discharging and charging volume of the alkaline aqueous medium, whereby a continuous displacement of the waste liquor with the fresh alkaline aqueous medium containing dissolved oxygen is carried out throughout the course of delignification to thereby eliminate the retardation of the reaction due to a

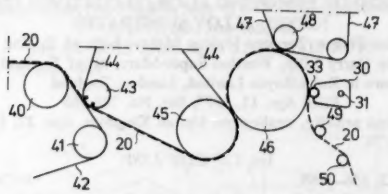
shortage of dissolved oxygen and to remove salts of organic acids by-produced from the interface between the cellulosic material and the alkaline aqueous medium, all of the oxygen which contacts said cellulosic material being introduced into said cellulosic material by said alkaline aqueous medium containing oxygen dissolved therein.

4,089,738

METHOD AND APPARATUS FOR INFLUENCING THE CHARACTERISTICS OF THE SURFACE OF A PAPER PRODUCT

Matti Kankaanpaa, Espoo, Finland, assignor to Valmet Oy, Finland

Filed May 20, 1975, Ser. No. 579,061
Claims priority, application Finland, May 23, 1974, 1587/74
Int. Cl.[2] B24B *39/00*; D21F *3/08, 50/00*; D21G *1/02*
U.S. Cl. 162—206 **18 Claims**



1. In a method for operating a machine which manufactures a sheet material such as paper or cardboard, the steps of lapping a moving web of sheet material over a roll of the machine so that the web of sheet material has an inner surface region engaging said roll and an outer surface region directed away from said roll, and pressing against said outer surface region of the sheet material a relatively smooth, hard surface which extends across the entire width of the web of sheet material and forms part of a smoothing member for imparting desired characteristics to the surface of the web engaged by the smoothing member, while maintaining a predetermined pressure between the smoothing member and the web and while providing a frictonal rubbing action between the outer surface region of the web of sheet material and the smoothing member, and including the step of angularly reciprocating the smoothing member about an axis parallel to the axis of said roll while maintaining smoothing member in engagement with said outer surface region of the web of sheet material across the entire width thereof.

2. In a method as recited in claim 1 and wherein said roll forms part of a drying section of the machine.

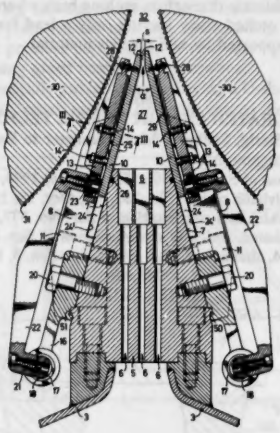
4,089,739

HEAD BOX HAVING GUIDE BLOCK AND ADJUSTABLE SLICE PLATES

Otto Hildebrand, Ravensburg-Taldorf; Christoph Link, Ravensburg; Siegfried Reutter, Gerbertshaus, and Wolf-Gunter Stotz, Ravensburg, all of Germany, assignors to Escher Wyss GmbH, Ravensburg, Wurtt, Germany

Filed Jan. 21, 1977, Ser. No. 760,959
Claims priority, application Switzerland, Jan. 27, 1976, 955/76
Int. Cl.[2] D21F *1/06*
U.S. Cl. 162—343 **10 Claims**

5. A head box for a paper making machine comprising
a distributor for receiving a flow of pulp;
a pulp guide block having ducts therein for uniformly distributing the flow of pulp from said distributor;
a pair of plates slidably mounted on said block to define a nozzle duct, each said plate having a surface at one end opposite and parallel to a surface of the other of said plates to define a pulp exit throat for discharging a uniform flow of pulp from said pulp guide onto at least one wire, said plates being disposed to define an angle therebetween; and



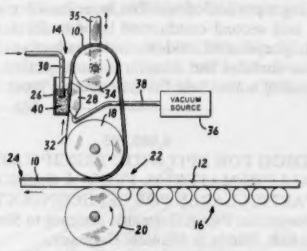
an adjusting means secured to said plates for moving said plates simultaneously by the same amount relative to said guide block while maintaining said angle therebetween.

4,089,740

APPARATUS FOR APPLYING SECONDARY LAYER ON BOARD SURFACE

Theodore Eugene Hillman, Cloquet, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Filed Jan. 30, 1976, Ser. No. 653,810
Int. Cl.[2] D21H *1/06*
U.S. Cl. 162—304 **2 Claims**



1. Apparatus for applying a secondary layer in the form of a slurry to a pressed board product in the wet mat state comprising:
(a) an endless belt having a first surface having a plurality of perforations therethrough;
(b) slurry reservoir means;
(c) vacuum means positioned adjacent said reservoir means and separated therefrom by said belt;
(d) drive means for rotating said endless belt and moving it between said reservoir and vacuum means whereby the vacuum creates a pressure differential which acts through the perforations to draw the slurry in the reservoir against the moving first surface, the vacuum being sufficient to cause the slurry to build on and adhere to the moving first surface in a layer said drive means being a first pair of rollers about which said belt rotates, at least one of said first pair of rollers being driven;
(e) pressing means for pressing said first surface and layer thereon on said wet mat product to thereby apply the

slurry layer on said first surface to the wet mat product and

(f) said pressing means being at least one pair of opposed pressing rollers and support means to support and move said wet mat product therebetween, said first pair of rollers and said pair of pressing rollers having a common roller and said pair of pressing rollers being positioned to pass said belt between said one common roller and said product to press said first surface and layer thereon.

4,089,741

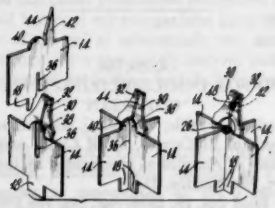
MIXING VANE GRID SPACER

John F. Patterson, and Kirk P. Galbraith, both of Richland, Wash., assignors to Exxon Research & Engineering Co., Linden, N.J.

Division of Ser. No. 554,000, Feb. 28, 1975. This application Jun. 11, 1976, Ser. No. 695,262

Int. Cl.[2] G21C *3/34*

U.S. Cl. 176—87 **3 Claims**



1. A method of forming a grid spacer adapted to support nuclear fuel rods in fixed spacial relation, wherein said spacer includes a plurality of intersecting and interlocking strips with said strips forming intersecting joints throughout said spacer, comprising the steps of: joining said strips to form said plurality of intersecting joints; providing at predetermined ones of said intersecting joints a plurality of vanes of predetermined configuration and angularly disposed relative to said strips; forming from said vane first protruding tabs which extend from the edge of said strips carrying said vanes at said intersecting joints which have said vanes; forming a second plurality of protruding tabs on the other of said strips which intersects with the strips which carry said vanes and located at each of said intersecting joints which has a first protruding tab, such that said first and second tabs are disposed in intersecting relation; fusing said protruding tabs at said intersecting joints down into said intersecting joints such that said protruding tabs are consumed whereupon there is formed in said vanes an opening at the base thereof having a shape of the same general configuration as that of said first protruding tab, whereby the flow mixing capability of said spacer is improved.

4,089,742

NUCLEAR FUEL ELEMENT SPACER MEANS

Louis Amaral; Kenneth Wood Brayman, and Bart Alan Smith, all of San Jose, Calif., assignors to General Electric Company, San Jose, Calif.

Continuation of Ser. No. 573,724, May 1, 1975, abandoned. This application Nov. 1, 1976, Ser. No. 737,230

Int. Cl.[2] G21C *3/30*

U.S. Cl. 176—78 **3 Claims**

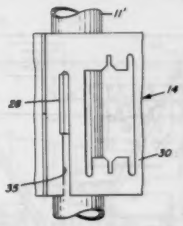
1. A fuel assembly for a nuclear reactor comprising:

(a) a plurality of elongated elements including fuel elements supported between upper and lower tie plates,

(b) a plurality of axially-spaced element spacers positioned between said upper and lower tie plates to retain said elements in laterally spaced relation to one another, said spacers including a plurality of intersecting members forming passages for said elements,

(c) at least one of said elements serving as a spacer retaining element and being formed with a plurality of laterally extending lugs secured thereto and individually engaging one of said members of respective ones of said spacers to retain said spacers in spaced axial position,

(d) each of said one of said members being formed with a vertically extending slot therethrough to removably receive one of said lugs, said slot having an open end and a closed end,



(e) whereby said one element is prevented by said one of said members of said spacers from rotation about its own axis when said one lug is received within said slot,

(f) said open end of said slot facing downwardly whereby said lugs engage the closed upper ends of said slots to prevent downward movement of said spacers.

4,089,743

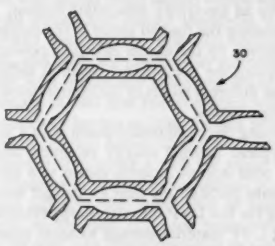
FLOW DUCT FOR NUCLEAR REACTORS

Jerry L. Straalsund, Richland, Wash., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 21, 1977, Ser. No. 761,038

Int. Cl.[2] G21C *3/30, 15/00, 5/08*

U.S. Cl. 176—78 **6 Claims**



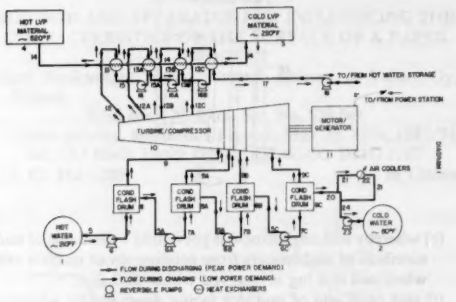
1. A tubular coolant flow duct for housing fuel pins within said duct, said duct providing an improved breeding ratio and an increased lifespan, comprising said tubular flow duct having walls forming a regular polygonal cross-section, the thickness of said duct wall cross-section varying peripherally about said duct, said thickness being greatest adjacent corners of said polygon and least at a location intermediate said corners of said polygon, the inner surfaces of said tubular flow duct walls being flat and the outer surfaces of said tubular flow duct walls being concave, so that each of said walls is of reduced cross-section along the longitudinal center line of each wall and of greater cross-section along the wall end points to form said regular polygonal cross-section, said tubular flow duct with said varying wall thickness providing an increased life for said duct and an increased breeding ratio.

4,089,744

THERMAL ENERGY STORAGE BY MEANS OF REVERSIBLE HEAT PUMPING

Robert P. Cahn, Millburn, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Nov. 3, 1976, Ser. No. 738,604
Int. Cl.[2] G21C *15/12*
U.S. Cl. 176—87 9 Claims



1. A process for storing the excess electrical output of an electricity generating system by raising the temperature level of a quantity of stored low vapor pressure (LVP) organic heat retention material, and recalling said heat from said LVP organic heat retention material during periods of peak power demand for reconversion into electrical power comprising the steps of:

(a) during periods of low power demand drawing hot water from a hot water storage location means;

(b) flashing said hot water at successively lower pressures to generate steam and cooling resultant residual water condensate to form cold water which is stored in cold water storage location means;

(c) conducting said flashed steam to various stages of a compression means;

(d) driving said compression means by means of a motor means powered by means of excess electrical power produced by an electricity generating system;

(e) compressing the flashed steam in the compression means being driven by the excess electrical power;

(f) conducting the compressed steam at different pressures from the different stages of the compression means to heat exchanger means;

(g) contacting the compressed steam with a low vapor pressure organic thermal energy retention material moving from a cold storage location means to a hot storage location means through the heat exchanger means of (f);

(h) storing the hot LVP thermal energy retention material in the hot LVP material storage location means;

(i) during periods of peak power demand converting water into steam by contacting said water with hot LVP material moving from hot storage location means to cold storage location means, said contacting occurring in heat exchanger means;

(j) conducting the steam generated in step (i) from the heat exchanger means to an expansion engine means thereby converting heat energy into mechanical motion;

(k) running a generator by means of the mechanical motion produced in step (j) thereby effecting the conversion of heat back into electricity;

(l) condensing the spent steam by means of cold water being passed from said cold water storage location means to said hot water storage location means; and

(m) storing the hot water produced in step (l) in said hot water storage location means for use during lower power demand system charging periods as the hot water of step (a) above.

4,089,745

PROCESS FOR ENZYMATICALLY CONVERTING CELLULOSE DERIVED FROM CORN HULLS TO GLUCOSE

Richard Lee Antrim, Clinton, and Donald Wayne Harris, Camanche, both of Iowa, assignors to Standard Brands Incorporated, New York, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,727
The portion of the term of this patent subsequent to Jul. 26, 1994, has been disclaimed.
Int. Cl.[2] C12D *13/02*
U.S. Cl. 195—33 5 Claims

1. A process for enzymatically converting corn hull cellulose to glucose comprising treating corn hulls with a sufficient amount of alkali to hydrolyze the hulls to affect liberation of a hemicellulose fraction, a non-carbohydrate fraction and a cellulose fraction and enzymatically treating the cellulose to convert a substantial portion thereof to glucose.

4,089,746

METHOD FOR INSOLUBILIZING ENZYMES ON CHITOSAN

Merle S. Masri, Emeryville; Virginia G. Randall, and William L. Stanley, both of El Cerrito, all of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jul. 19, 1976, Ser. No. 706,980
Int. Cl.[2] C07G *7/02*
U.S. Cl. 195—63 17 Claims

12. An insoluble but active enzyme comprising a soluble enzyme and chitosan cross-linked with a polyfunctional agent into a gel and then granularized with a reducing agent.

4,089,747

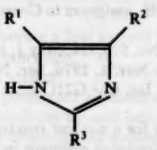
COMPOSITIONS FOR THE DETECTION OF HYDROGEN PEROXIDE

Barbara Jungfleisch Bruschi, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 9, 1976, Ser. No. 712,972
Int. Cl.[2] G01N *31/14*
U.S. Cl. 195—99 20 Claims

1. In a composition for the determination of hydrogen peroxide in aqueous solution, said composition comprising a substance having peroxidative activity and a dye-providing material which undergoes a detectable change upon contact with hydrogen peroxide and the substance having peroxidative activity, the improvement wherein the dye-providing material comprises:

a triarylimidazole of the formula



wherein R^1, R^2, and R^3 are each an organic group such that at least one of R^1, R^2, and R^3 is an ortho or para hydroxy substituted aryl group of up to 18 carbon atoms; the other two R^1, R^2, and R^3 being aryl groups chosen such that the oxidation potential of the imidazole lies between −70 mV to +110 mV measured by cyclic voltometry against a standard calomel electrode using a carbon based electrode.

4,089,748

MICROORGANISM GROWTH PROCESS AND CELL

Ronald B. Smernoff, Belmont, Calif., assignor to Analytical Products, Inc., Belmont, Calif.

Filed Aug. 27, 1976, Ser. No. 718,101
Int. Cl.[2] C12B 1/00
U.S. Cl. 195—104 25 Claims

1. A process for growing a microorganism upon the surface of an agar-based nutrient gel without substantially effecting the rate of growth of microorganisms grown thereon, comprising:

intermixing with agar, essential nutrients and water, sufficient of said agar being used to insure formation of a gel, and, from about 0.0008 to about 0.2 weight percent of a dialkylpolysiloxane based on total gel weight;

gelling the resulting intermixture in a microorganism growth container to form a growth cell with a completely smooth top surface on the gel therein;

inoculating the smooth top surface of said gel with a bacterial microorganism; and

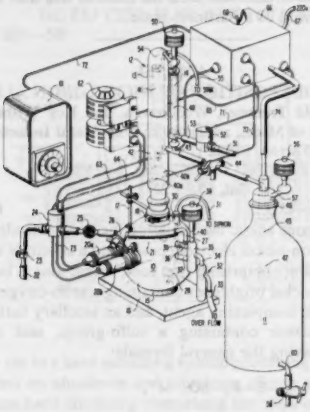
incubating said cell under preselected incubation conditions to grow said bacterial microorganisms upon the smooth top surface of the gel at substantially the same rate of growth as occurs on a completely smooth surface of an otherwise identical gel lacking said dialkylpolysiloxane.

4,089,749

APPARATUS FOR PRODUCING HIGH-PURITY WATER

Narbik A. Karamian, Bethesda, Md., assignor to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.

Filed Mar. 29, 1976, Ser. No. 671,713
Int. Cl.[2] B01D 3/00
U.S. Cl. 202—176 7 Claims



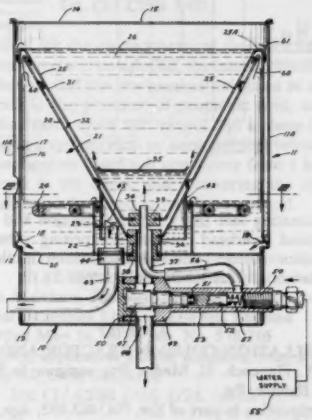
1. An apparatus for the production of high-purity, bacteria-free and endotoxin-free water, the apparatus comprising distillation flask means; a condenser unit; carboy means for receiving and storing the high-purity water; fluid communication means for effecting direct, internal fluid communication from said flask means to said condenser unit and thence to said carboy means, said flask means, said condenser unit, said carboy means and said communication means defining the interior of the apparatus and being serially connected; and hydrophobic, nonabsorbent filter means coupled to said interior of the apparatus for removing airborne bacteria and dust particles while allowing air to enter and to leave said interior of the apparatus, said filter means including at least one air filter in fluid communication with the interior of said carboy means, at least one/air filter in fluid communication with the interior of said condenser unit and at least one air filter in fluid communication with the interior of said flask means.

4,089,750

WATER DISTILLER WITH CONE SHAPED CONDENSER

Fred C. Kirschman, Briardale Rte. 2, Bismarck, N. Dak. 58501, and Wallace B. Bolte, Box 204, Regent, N. Dak. 58650

Filed Aug. 5, 1976, Ser. No. 711,791
Int. Cl.[2] B01D 3/00
U.S. Cl. 202—180 12 Claims



1. A distiller apparatus comprising an outer housing forming a first interior chamber, means to heat water within said first interior chamber, first funnel shaped wall means positioned at least partially within said interior chamber and forming a second liquid retaining preheat chamber, the narrow portions of said funnel shaped wall means being at the lower end thereof, means to admit liquid to be distilled into said second chamber, passage means between said second chamber and said first interior chamber to permit liquid to flow from said second chamber to said first interior chamber when the liquid in the second chamber reaches a desired level, second funnel shaped wall means mounted with respect to said housing, said first funnel shaped wall means being nested within said second funnel shaped wall means and spaced therefrom to form a collector passageway between the first and second funnel shaped wall means, said collector passageway surrounding said first funnel shaped wall means and extending along substantially the entire length of said first funnel shaped wall means, said collector passageway having an inlet opening surrounding the upper portions of the first funnel shaped wall means open to the interior chamber to provide a path for vapor to travel from the interior chamber through the passageway to an outlet opening positioned adjacent the lower end of said second funnel shaped wall means, said collector passageway being closed except for its inlet and outlet openings to collect condensed liquid and to permit flow of condensed liquid to said outlet opening.

4,089,751

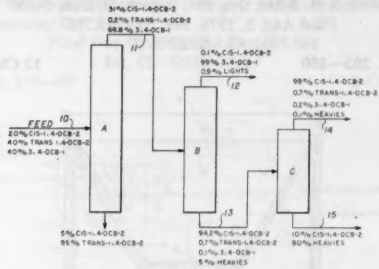
PROCESS FOR RECOVERING HIGH PURITY CIS-1,4-DICHLOROBUTENE-2

Lawrence A. Smith, Jr., Houston, Tex., assignor to Denka Chemical Corporation, Houston, Tex.

Filed Jan. 27, 1976, Ser. No. 652,832
Int. Cl.[2] B01D 3/10; C07C 21/00
U.S. Cl. 203—74 3 Claims

1. The method of recovering cis-1,4-dichlorobutene-2 in high purity comprising fractionating a mixture comprising 10 to 30 wt. % cis-1,4-dichlorobutene-2, 30 to 50 wt. % trans-1,4-dichlorobutene-2, and 30 to 50 wt. % 3,4-dichlorobutene-1 recovering a first overhead fraction containing a major amount of 3,4-dichlorobutene-1 and at least 20 wt. % cis-1,4-

dichlorobutene-2 and recovering a first bottom fraction comprising a major amount of trans-1,4-dichlorobutene-2, and



fractionating said first overhead fraction and recovering a second overhead fraction comprising substantially 3,4-dichlorobutene-1 and a second bottom fraction containing substantially cis-1,4-dichlorobutene-2.

4,089,752

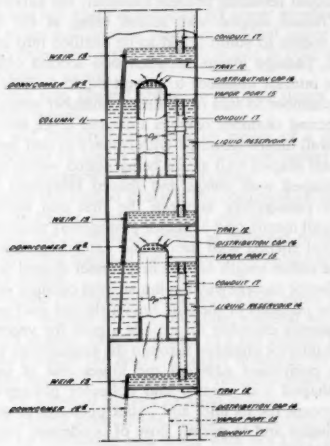
DISTILLATION COLUMN REACTOR AND PROCESS

Allen W. Hancock, II, Media, Pa., assignor to Sun Ventures, Inc., Radnor, Pa.

Continuation-in-part of Ser. No. 463,493, Apr. 24, 1974, abandoned, and a continuation-in-part of Ser. No. 588,277, Jun. 19, 1975, abandoned. This application Aug. 30, 1976, Ser. No. 718,750

Int. Cl.² B01D *3/20*

U.S. Cl. 203—99 **5 Claims**



4. A process for carrying out reactions in a distillation column reactor to provide increased residence time for reactants with a minimum drop in pressure in said column which comprises effecting said reaction in a distillation column containing a multiplicity of superposed conventional trays with downcomers and interdigitated single reservoirs, the downcomers of said trays extending to near the bottom of said reservoirs, the latter having therewithin means providing each of said reservoirs with substantial depth to hold liquid substantially out of contact with vapor, each of said reservoirs between an adjacent pair of trays occupying essentially the entire cross-sectional area of the column save for the area occupied by a vapor by-pass means and an open ended conduit extending through said reservoir to a substantial height above the bottom of said reservoir, said vapor by-pass means permitting vapors to flow through said by-pass from the tray below said by-pass to the tray above, said conduit extending from a predetermined substantial height above the bottom of its reservoir to below its reservoir, said conduit effecting flow of liquid from the top of the liquid surface of said reservoir to the tray below said reservoir.

4,089,753

PROCESS FOR THE PRODUCTION OF NICKEL CLAD STEEL COINAGE BLANK

Arthur G. McMullen, Edmonton; Michael J. H. Ruscoe, St. Albert; Maurice A. Clegg, and Ronald L. Prowse, both of Fort Saskatchewan, all of Canada, assignors to Sherritt Gordon Mines Limited, Toronto, Canada

Continuation-in-part of Ser. No. 637,800, Dec. 4, 1975, abandoned, which is a division of Ser. No. 516,248, Oct. 21, 1974, Pat. No. 3,940,254. This application Nov. 18, 1976, Ser. No. 742,820

Claims priority, application Canada, Sep. 16, 1974, 209325

Int. Cl.² C25D *7/00, 5/50, 17/20*

U.S. Cl. 204—23 **6 Claims**

1. A process for the production of coin blanks suitable for minting into coins, including providing metallic core pieces, each core piece having opposed, substantially planar faces and a common side edge, loading said core pieces into a perforated container, placing the container in an electroplating bath, electroplating a metallic cladding on the core pieces, while moving the container angularly about a horizontal axis, until the metallic cladding has a thickness of at least about 0.05 mm on each face of each core piece and a thickness of at least 2 to 4 times the face thickness on the side edge of each core piece, removing the cladded core piece from the container, and heating the cladded core pieces to produce a metallurgical bond between the metallic cladding and core piece of each cladded core piece and to decrease their hardness to less than about 65 on the Rockwell 30T hardness scale.

4,089,754

ELECTRODEPOSITION OF NICKEL-IRON ALLOYS

Robert Arnold Tremmel, Woodhaven, and Roy Wilbur Herr, Troy, both of Mich., assignors to Oxy Metal Industries Corporation, Warren, Mich.

Filed Jul. 18, 1977, Ser. No. 816,247

Int. Cl.² C25D *3/56*

U.S. Cl. 204—43 T **8 Claims**

1. An aqueous acidic bath suitable for the electrodeposition of a bright iron-nickel electrodeposit onto a substrate susceptible to corrosion comprising iron ions, nickel ions, a bath soluble primary nickel brightener containing a sulfo-oxygen group, a bath soluble complexing agent, and an auxiliary bath soluble nickel brightener containing a sulfo-group, said auxiliary brightener having the general formula:

$$R—SO_2—R_1—S—R_2—SO_3^-M^+,$$

wherein

R is an aliphatic hydrocarbon moiety having 1 to 4 carbon atoms, or aryl,

R_1 and R_2 are aliphatic hydrocarbon moieties of from 1 to 4 carbon atoms,

R and R_1 may be linked together to form an organic radical when R is aliphatic, and

M^+ is hydrogen, sodium, potassium, lithium or ammonium.

4,089,755

ACID BRIGHT ZINC PLATING

Carl P. Steinecker, Westland, Mich., assignor to The Richardson Company, Des Plaines, Ill.

Filed Jul. 11, 1977, Ser. No. 814,337

Int. Cl.² C25D *3/22*

U.S. Cl. 204—55 R **14 Claims**

1. An aqueous bath for producing a bright zinc electroplated deposit having a pH of from 4.0 to 6.5 and including from 20 to

100 grams per liter of zinc salt; from 100 to 200 grams per liter of ammonium chloride; from about 0.5 to about 20 grams per liter of a primary additive component, from about 0.05 to about 5.0 grams per liter of a brightening agent, and from about 0.5 to about 20 grams per liter of an auxiliary additive component, said primary additive component comprising a mixture of a cationic quaternary ammonium surfactant of the formula

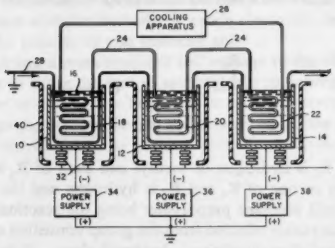
wherein R, R_1 and R_3 are lower alkyl radicals, R_2 is a polyoxypropylene radical and A is selected from the group consisting of halogen, sulfate and sulfamate, said ammonium surfactant having a molecular weight of from 500 to 3000 together with a lower alkyl substituted naphthalene sulfonic acid or water soluble salt thereof wherein the alkyl groups contain from 1 to 4 carbon atoms, the amount of cationic quaternary ammonium surfactant to alkylated naphthalene sulfonic acid or water soluble salt thereof ranging from about 10:1 to 1:10 parts by weight.

4,089,756

HARD ANODIZING PROCESS

Moisey M. Lerner, Brighton, and James H. Morse, Holliston, both of Mass., assignors to Sanford Process Corporation, Natick, Mass.

Filed Jul. 22, 1976, Ser. No. 707,691
Int. Cl.² C25D *11/02, 11/04, 11/12*
U.S. Cl. 204—58 **6 Claims**



1. For use in a hard anodizing system producing hard porous oxide films on aluminum and aluminum alloys, a method for continuous hard anodizing comprising the steps of:

providing a strong electrolyte in each of a plurality of electrically conductive tanks;

providing cooling means in the electrolyte of each of said tanks for maintaining said electrolyte at a predetermined low operating temperature;

disposing a conductive conveyor in the electrolyte of said plurality of tanks for movement of articles supported on the conveyor sequentially through the electrolyte of each of said tanks;

electrically isolating said pluraity of tanks, electrolyte and cooling means from electrical ground;

grounding the positive terminal of a power source which includes a power supply for each of said tanks, each power supply providing a different potential;

connecting said conductive conveyor and articles supported thereon to electrical ground; and

connecting each of said tanks to the negative terminal of a respective one of said power supplies.

4,089,757

ELECTROCHEMICAL OXIDATION OF ALKOXY-SUBSTITUTED AROMATIC COMPOUNDS

Mark A. Halter, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 752,652, Dec. 20, 1976. This application Sep. 27, 1977, Ser. No. 836,931
Int. Cl.² C25B *3/02*
U.S. Cl. 204—78 **13 Claims**

1. In a process for the electrochemical oxidation of an alkoxy-substituted aromatic compound, the improvement which comprises effecting said electrochemical oxidation in an electrochemical cell in the presence of propionic acid, an alkali metal or alkaline earth metal salt thereof and a phase transfer agent comprising a symmetrical or asymmetrical tetraalkylnitrogen or phosphonium-based salt containing from 1 to about 20 carbon atoms in the chain, and recovering the resultant acetoxylated alkoxy-substituted aromatic compound.

4,089,758

ELECTROLYTIC PROCESS

Kevin Thomas McAloon, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed May 16, 1975, Ser. No. 578,316
Claims priority, application United Kingdom, May 24, 1974, 23275/74; May 24, 1974, 23316/74
Int. Cl.² C25B *1/16, 1/26, 13/02*
U.S. Cl. 204—98 **17 Claims**

1. In a method of operating an electrolytic cell in which an aqueous electrolyte containing an ionizable compound is electrolyzed by means of an anode and a cathode the improvement comprising separating the anode and cathode by a diaphragm which comprises a porous polymeric material containing units derived from tetrafluoroethylene and having a microstructure that exhibits nodes interconnected together by fibrils, said material including a non-removable filler which is chemically resistant to the liquors in the cell and which renders the material wettable by the liquors in the cell.

4,089,759

METHOD FOR IMPROVING SELECTIVITY OF MEMBRANES USED IN CHLOR-ALKALI CELLS

Michael Krumpelt, Riverview, and Stanley Tariho Hirozawa, Birmingham, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Continuation-in-part of Ser. No. 619,606, Oct. 6, 1975, abandoned. This application Oct. 4, 1976, Ser. No. 729,201
Int. Cl.² C25B *1/16, 1/26, 13/08*
U.S. Cl. 204—98 **10 Claims**

1. A method for improving the selectivity of a membrane consisting of copolymerized polytetrafluoroethylene and sulfonated perfluorinated polyvinyl ether, in the salt or fill acid form, having an equivalent weight number of approximately 1000 to 1500 and a thickness of approximately 0.1 to 0.5 millimeters, said method comprising the step of thermally treating in a non-aqueous environment said membrane prior to use by subjecting it to a temperature of 100° to 275° Centigrade for a period of several hours to 4 minutes.

4,089,760

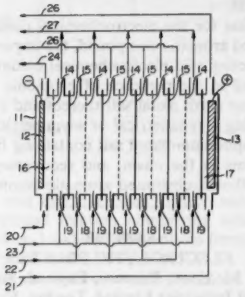
METHOD FOR REGENERATING WASTE DEVELOPERS USED FOR PROCESSING SILVER HALIDE PHOTOGRAPHIC MATERIALS AND METHOD FOR STORING DEVELOPERS

Takezo Ono, Mihara, Japan, assignor to Nippon Evr Limited, Japan

Filed Aug. 21, 1975, Ser. No. 606,610
Claims priority, application Japan, Aug. 30, 1974, 49-98922; Jan. 24, 1975, 50-9814; Feb. 26, 1975, 50-22800
Int. Cl.² C25C *1/20*
U.S. Cl. 204—109 **3 Claims**

1. A method for regenerating a waste developer left after

processing silver halide photographic materials, which comprises electrolyzing the waste developer using an electrodialytic cell comprising a cathode, an anode and alternating anion exchange membranes and cation exchange membranes arranged therebetween to define a cathode compartment adjacent the anion exchange membrane at one terminal of the cell, a plurality of intermediate enionation and deionation compartments with a set of the deionation compartments alternately disposed between a set of the enionation compartments, and an anode compartment adjacent the cation exchange membrane at the other terminal of the cell; the electrolysis being effected while passing the waste developer through the cathode compartment and charging the effluent from the cathode compartment into the deionation compartments.



4,089,761

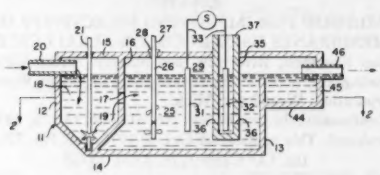
METHOD FOR TREATING SEWAGE

James L. Ramer, Rte. 1, Box 155, Sullivan, Mo. 63080

Division of Ser. No. 730,104, Oct. 6, 1976. This application Jan. 19, 1977, Ser. No. 760,482

Int. Cl.[2] C02C *5/12*

U.S. Cl. 204—149 **2 Claims**



1. The method of treating raw sewage comprising:
(a) comminuting raw sewage to provide an aqueous slurry,
(b) digesting said sewage slurry by oxygen-dependent bacteria,
(c) generating oxygen for said bacteria by electrolysis, and simultaneously generating hydrogen,
(d) maintaining said hydrogen separate from said oxygen,
(e) preventing the escape of oxygen from the vicinity of the bacteria, and
(f) venting said hydrogen.

4,089,762

PHOTOPOLYMERIZABLE COMPOSITIONS

Thomas William Gordon Frodsham, Billingham, England, assignor to Imperial Chemical Industries Limited, London, England

Filed May 16, 1975, Ser. No. 578,313

Claims priority, application United Kingdom, May 23, 1974, 23019/74

Int. Cl.[2] C08F *8/00, 2/46*

U.S. Cl. 204—159.15 **6 Claims**

1. A photopolymerisable composition which comprises an ethylenically unsaturated polyester, an ethylenically unsaturated comonomer, and a photosensitive catalyst comprising:
(a) at least one photosensitiser which is an alpha-diketone selected from the group consisting of biacetyl, benzil, alpha-naphthil, beta-naphthil, p-tolil, furil, p,p'-dialkoxybenzil, p,p'-dihalobenzil and p-nitrobenzil, and
(b) a reducing agent which is a N-alkyl- or N-cycloalkylmorpholine.

4,089,763

METHOD OF REPAIRING TEETH USING A COMPOSITION WHICH IS CURABLE BY IRRADIATION WITH VISIBLE LIGHT

Edward Charles Dart; John Burnett Cantwell; James Rodney Traynor; Joseph Franciszek Jaworzyn, and Jozef Nemeck, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

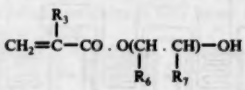
Division of Ser. No. 514,289, Oct. 11, 1974, which is a continuation-in-part of Ser. No. 463,145, Apr. 22, 1974, abandoned. This application Mar. 17, 1976, Ser. No. 667,866

Claims priority, application United Kingdom, Apr. 24, 1973, 19270/73

Int. Cl.[2] C08F *2/46, 4/00*

U.S. Cl. 204—159.23 **6 Claims**

1. A method of repairing teeth which comprises applying to the teeth a composition comprising:
(a) from 60 to 90% by weight of the composition of an inert, translucent, inorganic particulate filler of which at least 50% of the particles have a maximum dimension not greater than 500 microns and a Knoop hardness of at least 100, and
(b) a polymerisable material comprising:
a polymerisable prepolymer containing at least two polymerisable ethylenically unsaturated groups and being the reaction product of a urethane prepolymer and a polymerisable ethylenically unsaturated monomer reactive with said urethane prepolymer of the formula:



wherein R_3 is hydrogen or methyl and each of R_6 and R_7 is hydrogen or one of R_6 and R_7 is hydrogen and the other is methyl; said urethane prepolymer being the reaction product of a di-isocyanate selected from the group consisting of 4,4'-di-isocyanatodiphenylmethane, hexamethylene di-isocyanate, 4,4'-dicyclohexylmethane di-isocyanate and 2,4-tolylene diisocyanate, and a diol being the condensate obtained by reacting 2,2-bis-(p-hydroxyphenyl)propane and propylene oxide in a molar ratio of 1:2; up to 100% by weight of the polymerisable prepolymer of a liquid ethylenically unsaturated monomer which is copolymerisable with said polymerisable prepolymer selected from the group consisting of methyl methacrylate, ethylene glycol dimethacrylate, hydroxyethyl methacrylate, triethylene glycol dimethacrylate and allyl methacrylate; and from 0.01 to 10% by weight of the polymerisable material of a photosensitive catalyst capable of curing the composition on exposure to visible light and comprising:
a photosensitiser selected from fluorenone and an α-diketone of the formula A.CO.CO.A, wherein the groups A are aliphatic, aromatic, cycloaliphatic, aralkyl or alkaryl, or together form a divalent aliphatic or aromatic group which together with the carbonyl groups forms a cyclic structure, and a reducing agent capable of reducing the photosensitiser when the photosensitiser is in an excited state, and curing the composition by irradiating said composition with visible radiation in the range 400 mμ to 500 mμ.

4,089,764

PROCESS FOR PREPARATION OF β-BOURBONENE

Moriaki Higo, Hiratsuka; Hitoshi Saga, Hatano; Yoji Watanabe, Sakura, and Kunitomo Suzuki, Ninomiya, all of Japan, assignors to The Lion Dentifrice Co., Ltd., Tokyo, Japan

Filed Jun. 10, 1977, Ser. No. 805,543
Claims priority, application Japan, Jun. 11, 1976, 51-68554; Jan. 31, 1977, 52-9505
Int. Cl.² B01J 1/10
U.S. Cl. 204—162 R 8 Claims

1. Process for preparing β-bourbonene which comprises irradiating an essential oil containing germacrene D, with light to obtain β-bourbonene.

4,089,765

ELECTROIMPREGNATION OF PAPER AND NON-WOVEN FABRICS

Michael A. Dudley, Beaconsfield, Canada, assignor to Canada Wire and Cable Limited, Toronto, Canada

Filed Dec. 13, 1974, Ser. No. 532,696
Claims priority, application Canada, Dec. 14, 1973, 188217
Int. Cl.² C25D 9/00
U.S. Cl. 204—180 R 10 Claims

1. A method for electroimpregnation of paper and non-woven fabrics comprising the steps of:

(a) forming a bath of an aqueous solution containing about 1–30% of a material which, in said aqueous solution, exists in an at least partially dissociated state, said material having a specific conductance lower than 0.003 mhos cm^{-1};

(b) providing said bath with cathode and anode electrodes submerged in the solution;

(c) introducing a sheet of paper or non-woven fabric having a predetermined degree of porosity into said bath in contact with the cathode or anode electrode, dependant on the polarity of said material; and

(d) applying a predetermined DC voltage to the electrodes so as to cause the ions of said material to impregnate the paper or non-woven fabric when said ions move toward one or the other electrode and deposit within the paper or non-woven fabric as at least partially associated molecules.

4,089,766

METHOD OF PASSIVATING AND PLANARIZING A METALLIZATION PATTERN

Gabor Paal, Stuttgart, and Klaus Schackert, Herrenberg, both of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 17, 1977, Ser. No. 807,693
Claims priority, application Germany, Jul. 3, 1976, 2629996
Int. Cl.² C23C 15/00; B29C 17/08
U.S. Cl. 204—192 D 7 Claims

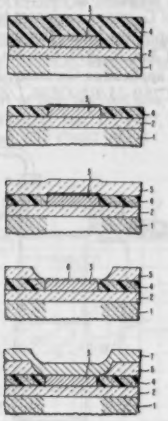
1. A process for passivating a metallization pattern on a substrate and for providing a substantially planar top surface for subsequent layers of metallization comprising the steps of:

providing a substrate with a first metallization pattern thereon;

applying a polymer material over said substrate and said metallization such that said polymer material will have a substantially planar top surface;

heating said structure as a first curing step for said polymer material;

removing said polymer material down to a thin layer of defined thickness over the first metallization pattern;



heating said resultant structure providing a second curing for said polymer material; and

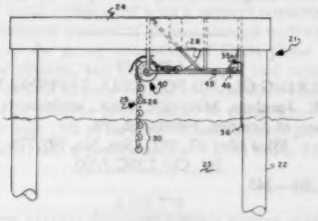
applying a layer of quartz over said polymer layer.

4,089,767

ANODE SYSTEM FOR THE CATHODIC PROTECTION OF OFF SHORE STRUCTURES

Rolland C. Sabins, Lakeside, Calif., assignor to Sabins Industries, Inc., Long Beach, Calif.

Continuation-in-part of Ser. No. 707,675, Jul. 22, 1976, and Ser. No. 719,990, Sep. 2, 1976, which is a continuation-in-part of Ser. No. 707,675, , and Ser. No. 512,108, Oct. 4, 1974, abandoned.
This application Nov. 17, 1976, Ser. No. 742,674
Int. Cl.² C23F 13/00
U.S. Cl. 204—197 23 Claims



1. A cathodic protection system for metallic structures disposed in contact with brine, comprising:

a plurality of sacrificial marine anodes mechanically linked in a chain;

conductive means for electrically coupling said chain of anodes to said structure;

support for suspending said chain above said brine with a portion including one end of said chain immersed therein; and

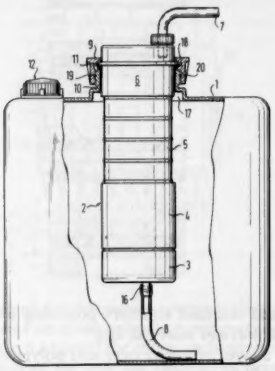
means above said brine and operably associated with the end of said chain opposite said one end for selectively paying out and retrieving said chain to correspondingly increase or decrease the amount of said chain, including said one end, immersed in said brine, thereby to correspondingly increase or decrease the current density impressed between the anodes and the structure through said brine.

4,089,768

BATTERY OPERATED WATER PURIFICATION SYSTEM

Wolfgang Fischer, Konigsberg, and Bernd Hengst, Schweinfurt am Main, both of Germany, assignors to Sachs-Systemtechnik GmbH, Schweinfurt am Main, Germany

Filed Jun. 8, 1977, Ser. No. 804,561
Claims priority, application Germany, Jun. 14, 1976, 2626569
Int. Cl.[2] C25B *15/02*; C02B *1/82*; C25C *3/20*
U.S. Cl. 204—228 12 Claims



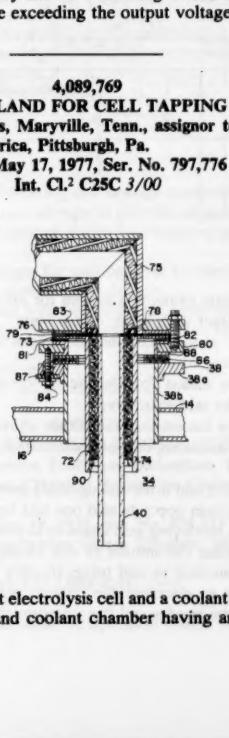
1. A water purification system comprising:
(a) an electrolytic cell adapted to hold a body of water to be purified;
(b) pump means including an electric motor for supplying said water to said cell and for discharging purified water from said cell;
(c) an electric battery;
(d) conductive means for directly connecting said battery to said motor and for thereby supplying electrical energy to said pump means; and
(e) direct-current power-supply circuit means connected to said battery and to said cell for receiving electrical energy from said battery and for furnishing to said cell a direct-current voltage exceeding the output voltage of said battery.

4,089,769

PACKING GLAND FOR CELL TAPPING TUBE

Charles E. Jennings, Maryville, Tenn., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed May 17, 1977, Ser. No. 797,776
Int. Cl.[2] C25C *3/00*
U.S. Cl. 204—245 2 Claims



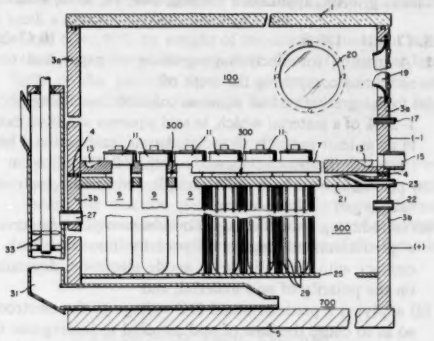
1. In a molten salt electrolysis cell and a coolant chamber on the cell, said cell and coolant chamber having an orifice extending therethrough from the exterior of the coolant chamber into the interior of the cell, a tapping apparatus including
a tapping tube in the orifice extending into the interior of the cell, and
a packing tube and packing in the orifice and surrounding said tapping tube,
wherein the improvement comprises the extending of the packing tube and packing past the coolant chamber.

4,089,770

ELECTROLYTIC CELL

Charles H. Lemke, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 11, 1977, Ser. No. 814,432
Int. Cl.[2] C25C *3/08, 3/02*
U.S. Cl. 204—247 24 Claims



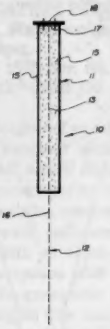
1. A cell for the electrochemical separation of metals from electrodissociatable compounds thereof in the molten state having
(a) an enclosed shell having top, bottom and side members;
(b) a molten metal collection zone comprising
(1) an upper horizontal fluid-tight partition positioned below the top of the cell, the partition having a plurality of open risers extending above the upper surface of the partition, the riser tubes being in fluid communication with
(2) a plurality of corresponding solid electrolyte tubes suspended from the upper partition, the tubes being joined to the upper partition in fluid-tight relationship at the upper end and closed at the lower end,
(3) negative current collector means extending into the upper end of each of the solid electrolyte tubes, and
(4) outlet means for removing molten metal in the collection zone from the cell; and
(c) an electrolyte circulation zone beneath the upper horizontal partition comprising
(1) a plurality of positive pole assemblies, each connected with positive current collector means, positioned concentrically to the outer longitudinal surface of each of the solid electrolyte tubes,
(2) outlet means for removing gas from the electrolyte circulation zone near the top thereof, and
(3) inlet means for feeding electrolyte feed materials into the circulation zone.

4,089,771

ELECTRODE FOR ELECTROLYTIC PROCESS INVOLVING HYDROGEN GENERATION

H. Benny Westerlund, Squamish, Canada, assignor to GOW Enterprises Limited, Vancouver, Canada

Continuation-in-part of Ser. No. 788,499, Apr. 18, 1977. This application Jun. 14, 1977, Ser. No. 806,409
Int. Cl.[2] C25B *11/03, 11/10*
U.S. Cl. 204—284 13 Claims



1. A titanium material bipolar electrode, the cathodic element of which has a core of dense titanium material, and a pores containing cathodic surface of powdered, pressed, and-/or sintered titanium.

4,089,772

ALKYLATION OR ACYLATION OF LIQUEFACTION PRODUCT BOTTOMS

Martin Leo Gorbaty, Fanwood, and Richard Henry Schlosberg, New Providence, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed May 21, 1976, Ser. No. 688,526
Int. Cl.[2] C10G *1/06*
U.S. Cl. 208—8 5 Claims

1. In a process for obtaining liquid hydrocarbons from solid coal which comprises subjecting the coal to conversion in a liquefaction zone in the presence of hydrogen and/or a hydrogen donor solvent at temperatures ranging from 600°–1000° F and pressures of 300–3000 psig and recovering a bottoms stream containing substantially all of the unconverted coal, the improvement which comprises treating at least a portion of the unconverted bottoms stream with a reagent selected from the group consisting of alkylating and acylating agents and thereby introducing into the unreacted coal aliphatic and acyl radicals respectively and thereafter liquefying at least a portion of the treated bottoms stream at said liquefaction conditions including elevated temperatures and pressures.

4,089,773

LIQUEFACTION OF SOLID CARBONACEOUS MATERIALS

Wilton F. Espenscheid, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 1, 1976, Ser. No. 746,451
Int. Cl.[2] C10G *1/04;* C10B *57/06*
U.S. Cl. 208—8 13 Claims

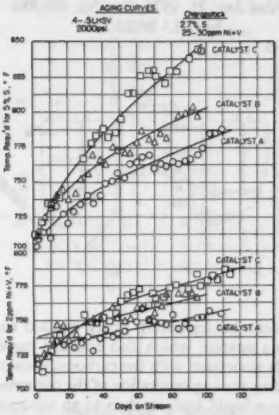
1. In a process for dissolution of solid carbonaceous material the improvement which consists essentially of heating at a temperature between about 400° and 1200° F and a pressure between about 200 and 6000 psi a slurry of comminuted carbonaceous material and a petroleum refinery highly aromatic residuum hydrogen-donor liquefaction solvent in contact with water, a catalytic quantity of primary alkanol, and carbon monoxide.

4,089,774

PROCESS FOR DEMETALATION AND DESULFURIZATION OF PETROLEUM OILS

Stephen M. Oleck, Moorestown; Howard S. Sherry, Cherry Hill, both of N.J.; Ronald H. Fischer, Oakton, Va., and Donald Milstein, Cherry Hill, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 608,604, Aug. 28, 1975, abandoned. This application Jun. 17, 1977, Ser. No. 807,764
Int. Cl.[2] C10G *23/02*
U.S. Cl. 208—89 6 Claims



1. A process for catalytically demetalizing and desulfurizing a hydrocarbon oil containing high metal and sulfur components, which comprises contacting said oil and hydrogen with a catalyst under demetallizing and desulfurizing conditions including a hydrogen pressure of about 500 to 3000 p.s.i.g., a hydrogen circulation rate of about 1000 to 15,000 scf/bbl of feed, a temperature of about 600° to 850° F, and a space velocity of 0.1 to 5.0 LHSV, said catalyst comprising the oxides or sulfides of a Group VIB metal and the oxides or sulfides of an iron group metal composited with a support consisting essentially of an intimate mixture of gamma alumina with an alumina selected from the group consisting of Delta phase alumina, Theta phase alumina, and mixtures thereof, said catalyst having at least 45% of its pore volume in pores 30 to 150A diameter, at least 10% of its pore volume in pores less than 30A diameter, at least 15% of its pore volume in pores greater than 300A diameter, and a surface area of 125 to about 210 m^2/g.

4,089,775

LOW POUR MIDDLE DISTILLATES FROM WIDE-CUT PETROLEUM FRACTIONS

Dietmar Berger, Wyoming, and Jackson Eng, Sarnia, both of Canada, assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Dec. 27, 1976, Ser. No. 754,242
Int. Cl.[2] C10G *13/02, 23/02*
U.S. Cl. 208—111 19 Claims

1. A process for simultaneously desulfurizing and dewaxing a raw, untreated, high sulfur-containing, wide-cut petroleum oil feed containing a middle distillate fraction which comprises contacting said feed and hydrogen with a catalyst comprising a hydrogenating component on a mixture of faujasite and amorphous silica/alumina support, said hydrogenating component comprising a metal oxide or metal sulfide of a Group VI-B metal, Group VIII metal or mixture thereof wherein the amount of faujasite in said mixture is from about 0.5 to 30 wt.% said contacting being carried out under mild hydrocracking conditions including a temperature within the range of from about 650° to 850° F and a hydrogen partial pressure ranging

between from about 750 to 2,000 psig to produce a low pour point middle distillate fraction product in an amount at least equal to the amount of said fraction present in said feed and having a sulfur and wax content lower than said middle distillate fraction of said feed.

4,089,776

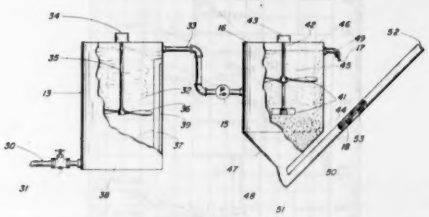
PROCESS FOR THE SEPARATION OF AGGLOMERATED CARBONACEOUS PARTICLES FROM ASSOCIATED INORGANIC MATERIALS

Russell L. McMurray, R.R. 2, Box 213, Duquoin, Ill. 62832

Filed Jan. 21, 1976, Ser. No. 650,886

Int. Cl.² B03D *3/06*

U.S. Cl. 209—5 **2 Claims**



1. In a process for separating finely divided carbonaceous particles from a mixture which also contains particulate inorganic materials associated with the carbonaceous particles, the process including the agglomeration of the carbonaceous particles by adding a liquid hydrocarbon to an aqueous dispersion of the mixture and by agitating the resultant mixture in a first tank, the improvement which comprises:

a. continuously feeding the agitated resultant mixture from said first tank into a second tank containing liquid, the resultant mixture being fed into the second tank at approximately the vertical middle of the liquid contained within said second tank;

b. agitating the resultant mixture in said second tank;

c. removing the inorganic materials from the bottom of said second tank, the bottom of said second tank being generally funnel shaped, the organic materials being removed through an auger, the auger having an inlet connected to the bottom of said second tank and an outlet positioned above the level of the resultant mixture within said second tank; and

d. removing the agglomerated carbonaceous particles from the top of said second tank, steps (b), (c) and (d) being performed simultaneously.

4,089,777

HIGH CAPACITY SEPARATOR FOR SEMOLINA

Malcolm Jack Macaulay, 1945 Porter, #A56, Wichita, Kans. 67203, and Ernesto Simroth L., Mississippi 343 Pte. Colonia del Valle, Garza Garcia, Nuevo Leon, Mexico

Filed May 6, 1976, Ser. No. 683,907

Int. Cl.² B07B *1/06*

U.S. Cl. 209—259 **7 Claims**

1. A separator for use in a flour mill for separating a coarse and fine product from crushed grain, said separator comprising:

a housing for said separator;

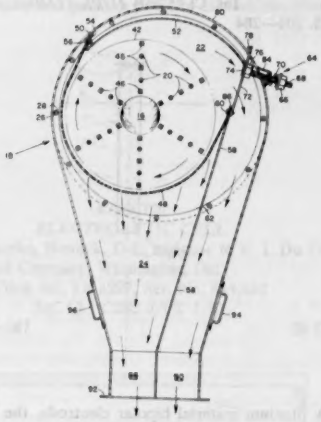
a drum section in said housing having an opening in a first end thereof for receiving crushed grain;

stationary hammers connecting to said first end;

rotating plate means having rotating hammers thereon, said rotating plate means being adjacent a second end of said drum section, said rotating hammers extending to close proximity with said first end and said stationary hammers extending to close proximity with said rotating plate means;

drive means extending into said drum section for turning said rotating plate means, said rotating hammers rotating between said stationary hammers to agitate said crushed grain received in said drum section;

dividing wall means extending downward from one side of said drum section, a second end of said arcuate screen means being attached to said dividing wall means;



flue means having at least two channels, a first channel of said flue means being located below said arcuate screen for receiving a fine product of said crushed grain falling through said arcuate screen, a second channel of said flue means receiving a coarse product of said crushed grain that falls over a top of said dividing wall means, said top being near the same plane as the rotating axis of said rotating plate means.

4,089,778

PROCESS FOR SEPARATING A SUBSTANCE FROM A LIQUID MEDIUM CONTAINING THE SUBSTANCE IN DISSOLVED FORM

Jürgen Gauger, Geneva, Switzerland, assignor to The Battelle Development Corporation, Columbus, Ohio

Filed May 29, 1974, Ser. No. 474,166

Claims priority, application Switzerland, May 29, 1973, 7696/73

Int. Cl.² B01D *13/00*

U.S. Cl. 210—23 F **17 Claims**

1. A process for separating solute molecules or ions with a molecular weight of less than 5000 from a liquid solution thereof, comprising the steps of:

(a) introducing into said solution at least one macromolecular substance selected from the group consisting of a polyvinylalcohol, polyacrylamide, polyvinylpyrrolidone, polyacrylates, dextrans, dextrins, albumin, pectic acid, polyacrylic acid, strongly cationic polyelectrolyte of the polyamine type and polyamides dissolved or dispersed in the form of a colloid and capable of fixing the said solute molecules or ions to form macromolecular associations of molecules, said macromolecular substance forming a homogeneous liquid phase with said liquid solution before and after fixing the said solute molecules whereby said macromolecular association of molecules remain dissolved or dispersed in said solution;

(b) allowing at least a substantial fraction of said solute molecules or ions to be fixed by the molecules of said macromolecular substance; and

(c) passing the homogeneous liquid medium thus obtained through a semipermeable ultrafiltration membrane with a porosity of from 50 to 100,000 Angstroms and capable of retaining the macromolecular association of molecules

formed between said macromolecular substance and said solute molecules or ions while allowing the molecules of the solvent of said liquid solution to pass through said membrane.

4,089,779

CLARIFICATION PROCESS

John A. Neal, Bellingham, Wash., assignor to Georgia-Pacific Corporation, Portland, Oreg.

Filed Nov. 24, 1975, Ser. No. 634,832
Int. Cl.[2] C02B *1/20*
U.S. Cl. 210—42 S 13 Claims

1. In a process for clarification of an aqueous liquid wherein dispersed particles are flocculated with an insoluble metal hydroxide, the improvement which comprises adding to the liquid a water-soluble ferromagnetic organic composition selected from the group consisting essentially of ferromagnetic compositions of lignosulfonate, sulfonated tannin, and sulfonated phenol condensed with an aldehyde to associate the ferromagnetic organic composition with the metal hydroxide flocculated particles, said ferromagnetic organic composition being prepared by dissolving an iron compound in an aqueous solution of the lignosulfonate, sulfonated tannin, or sulfonated phenol condensed with an aldehyde in an amount at least twice the stoichiometric amount to react with the sulfonate groups and reacting the mixture under conditions for the formation of magnetic iron oxide in the presence of an alkali and having the iron present in ferrous and ferric states, and separating the particles from the treated liquor in the presence of a magnetic field, said ferromagnetic organic composition being added to the liquid in an amount such that the amount of the ferromagnetic composition associated with the flocculated particles imparts a sufficient magnetization to the flocculated particles for the flocculated particles to be attracted by the magnetic field.

4,089,780

COLOR REMOVAL PROCESS

Jerry J. Svarz; Frank N. Kemmer, both of La Grange, Ill., and Jon O. Fabri, Spartanburg, S.C., assignors to Nalco Chemical Company, Oak Brook, Ill.

Continuation of Ser. No. 624,414, Oct. 21, 1975, abandoned, which is a continuation of Ser. No. 479,226, Jun. 14, 1974, abandoned. This application Aug. 6, 1976, Ser. No. 712,334
Int. Cl.[2] C02B *1/20*
U.S. Cl. 210—53 12 Claims

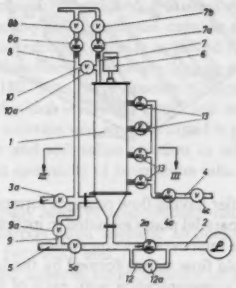
10. In a process for removing color from cellulose paper pulp soft wood and hard wood bleachery effluents wherein color bodies are present due to chemical reaction on or degradation of lignin, the improvement which consists essentially in adding to said effluents at a pH of 2 to 5 a cationic water soluble polyamine having an average molecular weight of at least 300 in sufficient amount to combine with said color bodies to form a color amine complex, said cationic water soluble polyamine being a polymer of ethylene diamine and ethylene dichloride, said pH not exceeding 5 for hard wood bleachery effluents and not exceeding 3.5 for soft wood bleachery effluents, thereafter adding to the resultant product a water soluble anionic organic coagulating polymer having an average molecular weight of at least 10,000 in sufficient amount to precipitate said color amine complex, said anionic organic coagulating polymer being a copolymer of approximately 70% by weight acrylamide and 30% by weight sodium acrylate, and separating the resultant precipitate.

4,089,781

METHOD OF AND APPARATUS FOR REGENERATING A PRESSURE FILTER

Hans Eskil Asp, Hammaro, Sweden, assignor to C J Wennberg AB, Sweden

Filed Jan. 27, 1976, Ser. No. 652,783
Claims priority, application Sweden, Jan. 28, 1975, 7500861
Int. Cl.[2] B01D *41/04*
U.S. Cl. 210—67 16 Claims



1. A method of regenerating a pressure filter apparatus comprising a first chamber and a second chamber separated by a filter media within said apparatus, said method comprising the steps of:

(a) feeding a liquid to be filtered into said first chamber and filtering said liquid through said media until said media requires cleaning,

(b) discontinuing step (a),

(c) feeding a pressurized gas into said first chamber for a time sufficient to remove unfiltered liquid from said media,

(d) discontinuing step (c),

(e) feeding a liquid wash medium into said first chamber, while simuntaneously feeding a pressurized gas into said second chamber for a time sufficient to clean said filter media, and

(f) discontinuing step (e), whereby said steps otherwise extend the serviceable life of said filter.

7. A regenerative pressure filtering apparatus comprising a first chamber and a second chamber separated by a filter media within said apparatus, said apparatus further comprising:

(a) means feeding a liquid to be filtered into said first chamber and filtering said liquid through said media until said media requires cleaning,

(b) means discontinuing the feeding of said liquid when said media requires cleaning,

(c) means feeding a pressurized gas into said first chamber for a time sufficient to remove unfiltered liquid from said media,

(d) means for discontinuing said means feeding a pressurized gas.

(e) means for substantially extending the useful life of said filter media consisting of means simultaneously feeding a liquid wash medium into said first chamber and a pressurized gas into said second chamber and,

(f) means for discontinuing the feeding of wash medium to said first chamber and pressurized gas to said second chamber when said media is cleaned,

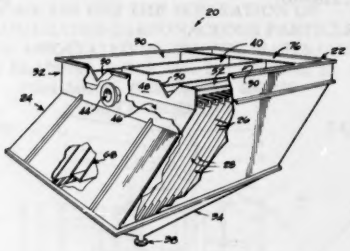
whereby the useful life of said filter is extended.

4,089,782

REVERSIBLE FLOW, INCLINED PLATE CLARIFIER

Werner P. E. Huebner, 6 Sweetbriar Court, Toronto, Ontario, Canada (M4A 2G5)

Filed Dec. 17, 1975, Ser. No. 641,465
Int. Cl.[2] B01D *21/10, 21/01*
U.S. Cl. 210—206 13 Claims



1. In a clarifier having flow passages formed by a plurality of spaced-apart parallel plates mounted in inclined relation within a housing, the improvement comprising

first manifold flow means formed by the housing above the plates in communication with each of the flow passages formed therebetween,

first conduit means in communication with the first manifold flow means,

first overflow control means regulating liquid flow through the first manifold flow means between the first conduit means and the flow passages,

a flow divider plate arranged in spaced-apart relation from the underside of each of the parallel plates and adjacent the lower end thereof while substantially spanning the width of the plate to form a partially enclosed region in communication with each flow passage,

a plate means extending transversely of the inclined plates and forming passages for respective communication with the enclosed region for each flow passage,

second manifold flow means formed by the housing in communication with the passages in the plate means and the enclosed regions formed between the parallel plates and respective divider plates,

second conduit means in communication with the second manifold flow means, and

second overflow control means regulating liquid flow through the second manifold flow means,

the first and second conduit means being interchangeably employable as inlet and outlet means for the clarifier whereby the clarifier may be selectively adapted for reversible operation in either an upflow or downflow mode.

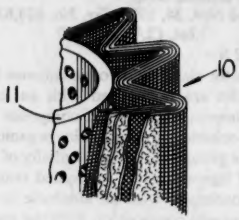
9. In a clarifier including a plurality of parallel, spaced-apart plates arranged in inclined relation within a housing to form inclined flow passages therebetween, the housing also forming first and second manifold flow chambers in communication respectively with the upper and lower ends of the flow passages and inlet and outlet conduit means for directing liquid through the manifold flow chambers and the inclined flow passages, the improvement comprising a multiple phase separation means adjacent at least one vertical end of each respective flow passage, each multiple phase separation means comprising a pair of L-shaped divider plates having legs mounted in spaced-apart relation to each other and the respective inclined plate adjacent a vertical end thereof to form two divided flow regions, separate manifold means being in respective communication with the divided flow region formed by each inclined plate and the adjacent divider plate as well as the divided flow region formed by the two divider plates.

4,089,783

FILTER

Kenneth Holyoak, Ravenshead, England, assignor to Crosland Filters Limited, Bolborough, England

Continuation of Ser. No. 615,801, Sep. 23, 1975, abandoned, which is a continuation-in-part of Ser. No. 545,351, Jan. 30, 1975, abandoned. This application Feb. 22, 1977, Ser. No. 770,627
Claims priority, application United Kingdom, Feb. 8, 1974, 5825/74
Int. Cl.[2] B01D *25/00*
U.S. Cl. 210—358 5 Claims



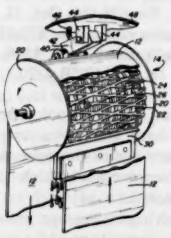
1. A multi-layer filter material assembly comprising; a filter medium which consists solely of a single delicate sheet formed of fibers of a glass, the fibers being formed in a layer and bonded together and capable of filtering particles on the order of 1.10 microns, said filter medium being supported on each side by at least one support sheet of a bonded synthetic fiber fabric and a sheet of metallic wire mesh, the two sheets of metallic wire mesh thus provided forming respectively the two outer most layers, the whole assembly adapted to be formed into a pleated configuration with the fiber fabric and mesh layers providing support for both sides of the glass fiber sheet, the glass sheet forming the only filtering medium in the assembly, and the support sheet avoiding crushing or disintegration of the delicate glass sheet.

4,089,784

BELT TYPE OIL REMOVAL UNIT

Gregory A. Ettelt, Berwyn, and Alfred L. Cohen, Deerfield, both of Ill., assignors to Tenco Hydro/Aerosciences, Inc., Countryside, Ill.

Filed Mar. 29, 1976, Ser. No. 671,383
Int. Cl.[2] B01D *17/00*
U.S. Cl. 210—526 2 Claims



1. A system for removing accumulated oil from a basin, which comprises: an endless belt for carrying oil, said endless belt being adapted for partial submergence in the basin; a rotary drum for supporting and driving said endless belt, said rotary drum having a rough, irregular surface formed from expanded metal overlaid in a wavefront configuration for frictional cooperation with a flat surface of said belt; an idler roller in rolling engagement with the outside surface of said belt for urging said belt against said irregular surface; an oil wiper on the downstream side of the drum for scraping oil

from said belt; an angled trough and conduit connected to the outlet thereof for directing the scraped oil away from the belt and basin; and means for wiping the underside of the drum surface.

4,089,785

COMPOSITION FOR IMPROVING FLAME RETARDANCY PROPERTIES OF TEXTILE FIBERS

Gordon Carlton Johnson, Armonk, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 668,800, Mar. 19, 1976, Pat. No. 4,054,695.
This application Jun. 16, 1977, Ser. No. 807,017
Int. Cl.[2] C09K *3/28*
U.S. Cl. 252—8.1 8 Claims

1. In a silicone textile treating composition containing a silicone textile treating agent, the improvement of having present in said composition a flammability retarding amount sufficient to retard flammability of a flammability retarder of the formula:

wherein x has a value of from 2 to 4; n has a value of from 1 to 5; R is carboxyl or hydroxyl; or a salt, ether or ester thereof.

4,089,786

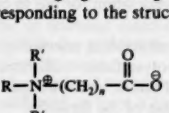
COMPOSITIONS FOR SOURING AND SOFTENING LAUNDERED TEXTILE MATERIALS, METHOD OF PREPARING THE SAME, AND STOCK SOLUTIONS PREPARED THEREFROM

John D. Ciko, Allen Park; John J. Cramer, and Geoffrey A. Jamieson, both of Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Division of Ser. No. 545,382, Jan. 30, 1975, Pat. No. 4,053,423.
This application May 26, 1977, Ser. No. 800,657
Int. Cl.[2] D06M *13/34*
U.S. Cl. 252—8.8 20 Claims

1. A stable homogeneous liquid composition for souring laundered textile materials and imparting softness thereto consisting essentially of

I. About 0.5–25% by weight of a softening agent for textile materials, the softening agent being a fatty amphoteric compound corresponding to the structural formula



wherein R is selected from the group consisting of monovalent alkyl radicals and sulfonated monovalent alkyl radicals containing about 8–22 carbon atoms, R′ is selected from the group consisting of monovalent alkyl radicals and sulfonated monovalent alkyl radicals containing about 1–3 carbon atoms, and n is about 1–6, the said amphoteric compounds having non-acidic isoelectric ranges;

II. About 3–50% by weight of an acidic souring agent for laundered textile materials selected from the group consisting of ammonium acid fluoride and potassium acid fluoride; and

III. About 25–96.5% by weight of water; the said ingredients I, II and III being present in amounts whereby a stable homogeneous liquid composition is produced.

4,089,787

INCREASING THE CLAY-DISSOLVING CAPABILITY OF A RELATIVELY HIGH PH SELF-GENERATING MUD ACID

James H. Lybarger; Charles C. Templeton; Edwin A. Richardson, and Ronald F. Scheuerman, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 16, 1977, Ser. No. 778,296
Int. Cl.[2] E21B *43/27*
U.S. Cl. 252—8.55 C 3 Claims

1. In a well treating process in which a stream of fluid containing at least one portion comprising a siliceous material-dissolving aqueous liquid solution or dispersion of ammonium fluoride or ammonium bifluoride and at least one relatively slowly reactive acid-yielding material capable of converting the fluoride salt to hydrogen fluoride is flowed from a surface location into a subterranean formation having a temperature exceeding about 180° F to there dissolve a siliceous material while having a pH which is initially near 7 and never becomes less than about 2, wherein said aqueous liquid is pure water or a relatively dilute and soft saline solution in which any dissolved salts consist essentially of ammonium salts the improvement comprising:

using as said slowly reactive acid-yielding material an ester of a 1 to 5 carbon atom aliphatic alcohol and a 2 to 5 carbon atom fatty acid; and

dissolving in said aqueous liquid solution or dispersion an amount of from about 0.5 to 1.5 moles per liter of an ammonium salt of ethylenediaminetetraacetic acid which is sufficient to increase the siliceous material-dissolving capability of the solution or dispersion.

4,089,788

METHOD FOR IMPROVING CALCIUM ION TOLERANCE OF HYDROCARBON POLYMER SULFONATE SURFACTANTS USED IN ENHANCED RECOVERY PROCESSING IN SUBTERRANEAN OIL-BEARING FORMATIONS

Edward F. McCarthy, Naperville, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Jun. 25, 1976, Ser. No. 699,695
Int. Cl.[2] E21B *43/22*
U.S. Cl. 252—8.55 D 17 Claims

1. In a method of flooding an oil-bearing subterranean formation with a solubilized oil-water mixture which is injected into the formation and displaced towards at least one production means wherein the mixture comprises: from about 2 to about 50 weight percent of a surfactant comprising an aliphatic hydrocarbon polymer sulfonate having an average equivalent molecular weight of from about 250 to about 675 and containing a sulfite salt; a cosurfactant selected from the group consisting of water-soluble alcohol, oil-soluble alcohol having no more than 10 carbon atoms and a 2 to 12 mole ethylene oxide adduct of an alcohol having from 4 to 10 carbon atoms or mixtures thereof, the weight ratio of cosurfactant to sulfonate ranging from about 1:5 to about 10:1; and from about 98 to about 50 weight percent of an aqueous sodium chloride containing brine solution; wherein the improvement increases the tolerance of said surfactant to calcium cation containing brines and comprises contacting said sulfonate with hydrogen peroxide at oxidation conditions to effect oxidation of the sulfite in the surfactant.

4,089,789

CORROSION INHIBITORS

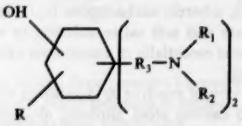
Thaddeus M. Muzyczko, Melrose Park; Samuel Shore, Roselle, and Jerome A. Martin, Chicago, all of Ill., assignors to The Richardson Company, Des Plaines, Ill.

Division of Ser. No. 223,768, Feb. 4, 1972, abandoned, which is a continuation of Ser. No. 763,580, Sep. 30, 1968, abandoned. This application Oct. 11, 1974, Ser. No. 514,124

Int. Cl.[2] C23F *11/04*; C23G *1/06*; C07C *87/29*

U.S. Cl. 252—8.55 E **17 Claims**

1. A method for inhibiting corrosion of ferrous metal in an acid system which comprises utilizing in such system a minor but effective amount of an inhibitor comprising an oxyalkylated phenolic composition or the acid stable salt thereof, said composition being the reaction product of an alkylene oxide having from 2 to 14 carbon atoms and a phenolic compound having two non-oxyalkylatable, saturated teriary-amino alkylene groups with the formula



wherein R is alkyl having 1 to about 18 carbon atoms or alkaryl with about 7 to about 12 carbon atoms, R_1 and R_2 are each alkyl having from 1 to about 9 carbon atoms and R_3 is alkylene having 1 to about 3 carbon atoms, said reaction product having been formed by reacting from about 1 to about 25 moles of said alkylene oxide per mole of the phenolic compound.

4,089,790

SYNERGISTIC COMBINATIONS OF HYDRATED POTASSIUM BORATE, ANTIWEAR AGENTS, AND ORGANIC SULFIDE ANTIOXIDANTS

John Howard Adams, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Nov. 28, 1975, Ser. No. 636,386

Int. Cl.[2] C10M *3/18, 5/14, 7/20, 7/24*

U.S. Cl. 252—18 **14 Claims**

1. A lubricating oil composition containing dispersed therein (1) from 1 to 60 weight percent of a particulate hydrated potassium borate having a mean particle size less than 1 micron and having a boron-to-potassium ratio of 2.5 to 4.5 and containing from 2 to 5 waters of hydration, (2) from 0.01 to 5 weight percent of an antiwear agent selected from (a) a zinc dihydrocarbyl dithiophosphate having from 4 to 20 carbons in each hydrocarbyl group, (b) a C_1 to C_{20} ester, C_1 to C_{20} amide, or C_1 to C_{20} amine salt of a dihydrocarbyl dithiophosphoric acid having from 4 to 20 carbons in each hydrocarbyl group, (c) a zinc alkyl aryl sulfonate; and (d) mixtures thereof, and (3) from 0.1 to 5 weight percent of an oil-soluble antioxidant organic sulfur compound containing from 3 to 40 weight percent sulfur, which sulfur is present as an organic sulfide or polysulfide or mixtures thereof.

4,089,791

LUBRICATING OIL COMPOSITION

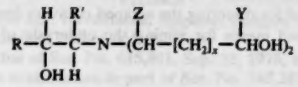
Haakon Haugen, Oslo, Norway, and David G. Weetman, Hopewell Junction, N.Y., assignors to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 470,688, May 16, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,585

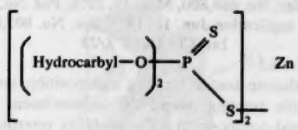
Int. Cl.[2] C10M *1/26, 1/48*

U.S. Cl. 252—32.7 E **2 Claims**

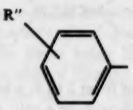
1. A low-ash lubricating oil composition comprising 85 to 95 weight percent of a mineral lubricating oil, 0.05 to 0.50 weight percent of an overbased alkaline earth metal sulfonate or carboxylate, 0.01 to 0.50 weight percent of a substituted trialkanolamine represented by the formula:



in which R is a hydrocarbyl radical having from 3 to 16 carbon atoms, R', Z and Y represent hydrogen or a hydrocarbyl radical having from 1 to 10 carbon atoms, and x is 0 or 1, and 0.025 to 0.50 weight percent of a zinc dihydrocarbyldithiophosphate represented by the formula:



in which the hydrocarbyl radical has from 4 to 24 carbon atoms and at least 50 percent of said hydrocarbyl radicals are alkaryl radicals having the formula:



in which R'' is an alkyl radical having from about 4 to 18 carbon atoms.

4,089,792

SYNERGISTIC ANTIOXIDANT ADDITIVE COMPOSITION

Warren Lowe, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Apr. 1, 1976, Ser. No. 672,804

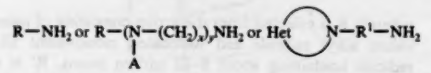
Int. Cl.[2] C10M *1/48, 1/38, 3/32, 5/28*

U.S. Cl. 252—32.7 E **18 Claims**

1. An additive composition for use in crankcase lubricating oils comprising:

(1) an oil-soluble antioxidant selected from aromatic or alkyl sulfides and polysulfides, sulfurized olefins, sulfurized carboxylic acid esters, and sulfurized ester-olefins, and

(2) a primary amine of the formula:



wherein each A is independently hydrogen or alkyl, R is alkyl or alkenyl of at least 6 carbon atoms, R^1 is an alkyl group of at least 2 carbon atoms, *x* is an integer from 2 to 4, *y* is 1 to 4, and Het forms with the N atom, a 5- or 6-membered heterocyclic ring optionally containing an additional N or O hetero atom and wherein the weight ratio of said anti-oxidant to said primary amine is 1:0.001–21.

2. A lubricating oil composition comprising an oil of lubricating viscosity and an antioxidant amount of the composition of claim **1**.

4,089,793

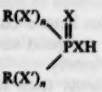
PREPARATION AND USE OF BASIC METAL SALT COMPOSITIONS OF PHOSPHORUS-CONTAINING ACIDS

Norman Anthony Meinhardt, Lyndhurst, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed May 19, 1977, Ser. No. 798,738
Int. Cl.[2] C10M *1/48, 3/42, 5/24, 7/46*
U.S. Cl. 252—32.7 E 49 Claims

1. A reaction mixture suitable for preparation of basic metal salt compositions of one or more phosphorus-containing acids which comprises:

(A) at least one Group II metal salt of one or more phosphorus-containing acids of the formula



(I)

wherein each X and X' are independently oxygen or divalent sulfur with the proviso that each *n* may be zero or one, each R is independently the same or a different hydrocarbon-based radical and the Group II metal has an atomic weight between about 24 and 115;

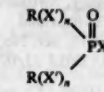
(B) at least one basically reacting alkali metal compound; and

(C) at least one di- or trivalent metal-containing salt or a mixture thereof, with the proviso that components (A), (B), and (C) are not the same;

wherein the equivalent ratio of the acid of (A) : (B) : (C) in the reaction mixture is sufficient to form a basic or a more basic metal salt of (A), and wherein zinc or cadmium is present in the reaction mixture in either (A) or (C) or both.

5. A process for preparing basic metal salt compositions of phosphoric acids which comprises reacting:

(A) at least one Group II metal salt of one or more phosphorus-containing acids of the formula



wherein each X and X' are independently oxygen or divalent sulfur with the proviso that each *n* may be zero or one, each R is independently the same or a different hydrocarbon-based radical, and the Group II metal has an atomic weight between about 24 and 115;

(B) at least one basically reacting alkali metal compound; and

(C) at least one di- or trivalent metal-containing salt or a mixture thereof, with the proviso that components (A), (B), and (C) are not the same;

wherein the equivalent ratio of the acids of (A) : (B) : (C) in the reaction is sufficient to form a basic or a more basic metal salt of (A), and wherein zinc or cadmium is present in the reaction mixture in either (A) or (C) or both.

4,089,794

POLYMERIC ADDITIVES FOR FUELS AND LUBRICANTS

Lawrence J. Engel, Green Brook, and John B. Gardiner, Mountainside, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 590,040, Jun. 25, 1975, abandoned. This application Sep. 17, 1976, Ser. No. 724,464
Int. Cl.[2] C10M *1/28, 1/36;* C08L *23/26*
U.S. Cl. 252—51.5 A 17 Claims

1. A process for preparing a lubricating oil concentrate of a viscosity index improver having sludge dispersing properties and a number average molecular weight in the range of about 10,000 to 250,000; comprising dissolving from 5 to 30 weight percent of ethylene copolymer comprising 30 to 80 wt. % ethylene and 20 to 70 wt. % C_3 to C_{18} alpha-olefin in a mineral lubricating oil as solvent, maintaining said resulting copolymer-oil solution at a temperature of from about 100° C. to about 250° C. and under an inert atmosphere while admixing an ethylenically-unsaturated dicarboxylic acid material selected from the group consisting of maleic anhydride, maleic anhydride derivatives, maleic acid and fumaric acid, and a free-radical initiator having a boiling point in excess of about 100° C. into said solution, wherein the weight ratio of said dicarboxylic acid material to said initiator is about 1:1 to 30:1, and maintaining said temperature and inert atmosphere for about 0.1 to 12 hours to graft said acid material onto said ethylene copolymer and said solvent, without substantial molecular weight breakdown of said ethylene copolymer, and thereafter reacting carboxy groups of said grafted polymer with a polyfunctional material selected from the group consisting of polyamines having 3 to 20 carbon atoms and 2 to 12 nitrogen atoms, C_2 to C_{30} polyols having 2 to 10 hydroxyl radicals, and C_2 to C_{30} hydroxy amines having 1 to 6 hydroxy groups and 1 to 10 nitrogen atoms, to thereby form said lubricating oil concentrate.

4,089,795

ORTHOPHOSPHATE AND SILICA-CONTAINING COMPOSITION

John Bailey, Crawcrook; Michael John Randell, and Paul Richard Sherrington, both of Newcastle-upon-Tyne, all of England, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 12, 1976, Ser. No. 657,527
Claims priority, application United Kingdom, Feb. 14, 1975, 6359/75
Int. Cl.[2] C11D *3/06, 7/16*
U.S. Cl. 252—135 16 Claims

1. A granular detergent composition consisting essentially of:

(a) from about 5% to about 60% by weight of sodium or potassium orthophosphate as a precipitating builder;

(b) from about 1% to about 40% by weight of silica having a mean particle diameter less than 20 microns; and

(c) an organic detergent at from about 1% to about 50% by weight of the composition.

4,089,796

TREATMENT OF WATER OR AQUEOUS SYSTEMS

Arthur Harris, Stockport; John Burrows, Congleton, and Thomas Ivor Jones, Poynton, all of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 575,690, May 8, 1975, Pat. No. 3,963,636, which is a division of Ser. No. 312,019, Dec. 4, 1972, Pat. No. 3,897,209. This application Jun. 14, 1976, Ser. No. 695,345
Claims priority, application United Kingdom, Dec. 10, 1971, 57413/71
The portion of the term of this patent subsequent to Jun. 15, 1993, has been disclaimed.
Int. Cl.[2] C02B *5/02, 5/06*
U.S. Cl. 252—181 7 Claims

1. A composition for inhibiting the corrosion and scale forming tendencies of water or an aqueous system consisting essentially of

(a) from 20 to 97.5% by weight of the total composition of an additive combination which consists of from 2.5 to 80% by weight of zinc (calculated as Zn^{++}) and from 97.5 to 20% by weight of hydrolysed polymaleic anhydride, having an average molecular weight of from 300 to 5,000, or of a water soluble salt of such a hydrolysed polymaleic anhydride, and

(b) from 2.5 to 80% by weight of the total composition of at least one corrosion inhibitor selected from the group consisting of a benzotriazole and a bis-benzotriazole.

4,089,797

CHEMILUMINESCENT WARNING CAPSULES

Carl A. Heller, China Lake; Herbert P. Richter, Ridgecrest, and Rudolph J. Marcus, San Juan Capistrano, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 21, 1977, Ser. No. 779,656
Int. Cl.[2] C09K *3/00*
U.S. Cl. 252—188.3 CL 7 Claims

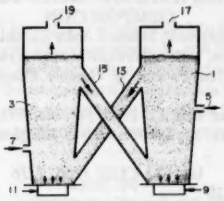
1. As an article of manufacture, a device comprising a capsule, an air-reactive chemiluminescent material within the capsule and a catalytic material affixed to the outer surface of the capsule, said catalytic material being a material capable of catalyzing a reaction between the air-reactive chemiluminescent material and air.

4,089,798

PROCESS FOR PRODUCING REDUCING GAS

Hiroshi Sugiyama; Kuniki Yoshitake; Nobuhiko Sakata; Taizo Sugioka, and Nobuhisa Mizuno, all of Sodegaura, Japan, assignors to Idemitsu Kosan Company, Ltd., Tokyo, Japan

Filed Jul. 16, 1976, Ser. No. 705,922
Claims priority, application Japan, Jul. 25, 1975, 50-90783
Int. Cl.[2] C01B *2/16;* C10G *11/28*
U.S. Cl. 252—188 13 Claims



1. A process for producing a reducing gas containing less than 3 percent by volume of methane, which comprises heating a reaction charge consisting essentially of a heavy hydrocarbon having an atomic ratio of carbon to hydrogen of more than one and steam at a temperature of from 800° to 950° C. in the presence of a catalyst comprising at least one metal selected from the group consisting of potassium, nickel, cobalt and molybdenum or at least one oxide of said metals, supported on alumina or a silica-alumina composite, the weight ratio of steam to the heavy hydrocarbon being from 0.5 to 5.

4,089,799

LUMINESCENT FLUORIDE

Johannes Leonardus Sommerdijk, and Francisca Maria Johanna Henrica Hoex-Strik, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 1, 1977, Ser. No. 812,245
Claims priority, application Netherlands, Jul. 13, 1976, 7607723
Int. Cl.[2] C09K *11/46*
U.S. Cl. 252—301.4 H 3 Claims

1. A luminescent bivalent europium-activated fluoride according to the formula

$$AB_{1-x-y}Mg_xEu_yF_3,$$

wherein A represents cesium and/or rubidium and B represents calcium and/or strontium and wherein

$0.10 \leqq x \leqq 0.90$

$0.001 \leqq y \leqq 0.20$

$x + y \leqq 0.95$;

said luminescent fluoride having a higher quantum efficiency than the corresponding luminescent fluoride of the above formula in which either Mg or B is absent therefrom.

4,089,800

METHOD OF PREPARING MICROCAPSULES

Rodger G. Temple, Gibsonia, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 4, 1975, Ser. No. 565,284
Int. Cl.[2] B01J *13/02*
U.S. Cl. 252—316 11 Claims

1. A method of preparing void-containing microcapsules having a particle diameter of from about 0.1 micron to about 250 microns which comprises the steps of:

(A) preparing a solution containing thermoplastic or thermosetting organic polymer, a good solvent for the polymer and an organic liquid non-solvent and wherein the weight ratio of non-solvent to solvent is from about 1:1 to about 1:100;

(B) atomizing said solution into a bath containing water which is miscible with the good solvent and immiscible with the non-solvent whereby

the good solvent is extracted from the solution, thereby causing gellation of the polymer around discrete droplets of the non-solvent, thereby forming microcapsules containing droplets of said liquid non-solvent; and

(C) evaporating said liquid non-solvent from said microcapsules to produce void-containing microcapsules.

4,089,801

PROCESS FOR THE PREPARATION OF LIPOSOMES

Michel Schneider, Grand Lancy, Switzerland, assignor to Battelle Memorial Institute, Switzerland

Filed Jan. 12, 1976, Ser. No. 648,040
Int. Cl.[2] B01J *13/02*
U.S. Cl. 252—316 13 Claims

1. A process for the preparation of synthetic liposomes, including the steps of dispersing a first aqueous liquid with the aid of ultrasonic vibration in a carrier liquid which is insoluble in water or only slightly soluble in water and has a density less than that of water, in the presence of at least one compound of the general formula XY, where X represents a hydrophilic polar group and Y represents a hydrophobic non-polar group, selected from the group consisting of phospholipids and lipid-like substances in which the hydrophilic polar group X is selected from phosphato, carboxylic, sulphato, amino, hydroxyl and choline; and in which the non-polar hydrophobic group Y is selected from saturated or unsaturated hydrophobic aliphatic hydrocarbon groups and such aliphatic hydrocarbon groups which are substituted by at least one aromatic or cycloaliphatic group and mixtures of such phospholipids and lipid-like substances, so as to form a colloidal dispersion of the first aqueous liquid in the carrier liquid, the dispersed phase globules, each being bounded by a monomolecular film of the compound of the general formula XY; combining this dispersion with a second aqueous liquid to form a heterogeneous two-layer system comprising an upper liquid layer formed by the dispersion and a lower liquid layer formed by the second aqueous liquid, the two layers being separated by the monomolecular film of the compound of formula XY; and then centrifuging the two-layer system at an angular velocity sufficient for the dispersed globules of the first aqueous liquid to be forced by gravity through the monomolecular separating film of the compound XY and into the lower layer of the second aqueous liquid.

4,089,802
CAPSULE MANUFACTURE

Peter L. Foris; Robert W. Brown, and Paul S. Phillips, Jr., all of Appleton, Wis., assignors to NCR Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 487,322, Jul. 10, 1974, Pat. No. 4,001,140. This application Dec. 30, 1976, Ser. No. 755,831
The portion of the term of this patent subsequent to Jan. 4, 1994, has been disclaimed.
Int. Cl.[2] B01J *13/02*
U.S. Cl. 252—316 10 Claims

1. A process for manufacturing minute capsules, en masse, in an aqueous manufacturing vehicle, comprising the steps of:

(a) establishing an agitating aqueous system including urea, formaldehyde, about 0.75 to about 15 percent by weight, based on the weight of aqueous manufacturing vehicle, of a system modifier material selected from the group consisting of poly(ethylene-co-maleic anhydride), poly(-methyl vinyl ether-co-maleic anhydride), poly(acrylic acid), poly(propylene-co-maleic anhydride), poly(isobutylene-co-maleic anhydride), poly(butadiene-co-maleic anhydride) and poly(vinyl acetate-co-maleic anhydride), and particles of an intended capsule core material substantially insoluble in the system, in which agitating system the modifier material is present prior to the addition of said particles, and

(b) polycondensing the urea and formaldehyde to form a condensation polymer resulting in

(i) liquid-liquid phase separation of the urea/formaldehyde polymerization product above a molecular weight to be soluble in the system and

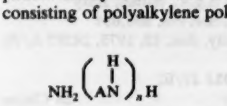
(ii) continued reaction of the separated liquid urea/formaldehyde polymerization product to give solid capsule wall material individually surrounding particles of the dispersed intended capsule core.

4,089,803
DEMULSIFICATION OF SURFACTANT-PETROLEUM-WATER FLOOD EMULSIONS

Donald U. Bessler, St. Louis, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Aug. 12, 1976, Ser. No. 713,707
Int. Cl.[2] B01D *17/04*
U.S. Cl. 252—344 14 Claims

1. A composition for demulsification of surfactant-petroleum-water flood emulsions comprising an oxyalkylated phenol-aldehyde resin and an amine selected from the group consisting of polyalkylene polyamines of the general formula



where A is $(CH_2)_x$ where x is 2 to 10 and n is a number from 1 to 10 and alkanolamines, the weight ratio of resin to amine varying from about 1 to 90.

4,089,804
METHOD OF IMPROVING FLUORINATED SURFACTANTS

Robert A. Falk, New City, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 30, 1976, Ser. No. 756,031
Int. Cl.[2] B01F *17/16*
U.S. Cl. 252—355 8 Claims

1. A method of improving the surface tension property of cationic, anionic, non-ionic, amphoteric or mixed function fluorinated surfactant by employing in conjunction with said surfactants an effective amount, to increase the surface tension reducing property of said surfactant, of a fluorinated synergist of the formula

$$(R_f)_n T_m Z$$

wherein

R_f is a straight or branched chain perfluoroalkyl of 1 to 18 carbon atoms or said perfluoroalkyl substituted by perfluoroalkoxy of 2 to 6 carbon atoms,

n is an integer of 1 or 2,

T is a divalent group $—R_3—$ or a group $—R_3—SCH_2CHR_1—$ wherein R_3 is straight or branched chain alkylene or haloalkylene of 1 to 12 carbons, arylene of 6 to 12 carbons, alkylenethioalkylene or alkyleneiminoalkylene of 2 to 12 carbons where in said imino group the nitrogen is secondary or tertiary and R_1 is hydrogen or alkyl of 1 to 12 carbons,

Z is a polar group selected from $—CONR_1R_2$, —CN, $—CONR_1COR_2$, $—SO_2NR_1R_2$, $—R_3(O_2CR_1)$ and $—CO_2R_1$ where R_1 and R_2 are independently hydrogen, alkyl of 1 to 12 carbons or alkyl of 1 to 12 carbons substituted with 1 or more —OH, $—COCH_3$, —SH, $—CONH(CH_3)$, and R_3 is as defined above, with the proviso that said synergist is neutral,

m is an integer from 0 to 2, and said fluorinated synergist having a solubility in water at 25° C. below 0.01% by weight.

4,089,805
PROCESS FOR PREPARING A GASIFORM HYDROCARBON FUEL FROM HYDROCARBON FUEL OIL

Lawrence Mitchell Gambrell, Houston, Tex., assignor to Allied Chemical Corporation, Morristown, N.J.

Continuation-in-part of Ser. No. 549,641, Feb. 13, 1975, abandoned. This application Jan. 13, 1977, Ser. No. 758,986
Int. Cl.[2] C01B *2/14, 2/16;* F23D *11/44*
U.S. Cl. 252—373 27 Claims

1. A process for preparing a gasiform hydrocarbon fuel from a hydrocarbon fuel oil, and maintaining same in such form into a gasiform burner, which comprises:

(a) partially vaporizing a liquid hydrocarbon fuel oil having a gravity of about 10°–50° A.P.I. at a temperature of 350°–675° F. in the presence of 5–90 percent by weight of non-oxidizing gas based on the weight of the vaporized portion of said hydrocarbon fuel oil, thereby producing a gasiform hydrocarbon fuel and a liquid residue, said gasiform hydrocarbon fuel consisting essentially of said vaporized liquid hydrocarbon and said non-oxidizing gas;

(b) separating said gasiform hydrocarbon from said liquid residue;

(c) superheating said gasiform fuel to maintain said gasiform fuel in the vapor state until it is burned, and

(d) thereafter burning said gasiform fuel in said gasiform burner.

4,089,806
METHOD FOR REJUVENATING HYDROPROCESSING CATALYSTS

Daniel R. Farrell, Anaheim, and John W. Ward, Yorba Linda, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed Apr. 1, 1977, Ser. No. 783,666
Int. Cl.[2] B01J *21/20, 23/94;* C10G *23/02*
U.S. Cl. 252—413 9 Claims

1. A process for rejuvenating a hydrodesulfurization catalyst comprising at least one Group VIB and/or Group VIII active component supported on an inorganic refractory oxide, said catalyst being deactivated with coke and at least 5 wt. % of nickel plus vanadium deactivants, calculated as the metals, which process comprises, prior to coke burn-off, contacting at a temperature between about 30° and 100° F said catalyst with an aqueous solution comprising oxalic acid and at least one inorganic component selected from the class consisting of nitric acid, sodium nitrate, ammonium nitrate, potassium nitrate, calcium nitrate, magnesium nitrate, copper nitrate and

aluminum nitrate, said solution containing at least 20 g/l of oxalic acid and between about 40 and 100 g/l of nitrate anion and said contacting being such that at least 25% of the nickel plus vanadium deactivants is removed and a substantial proportion of the hydrodesulfurization activity of the catalyst is restored.

4,089,807

REACTIVATION OF A PHOSPHORUS-VANADIUM-OXYGEN COMPLEX OXIDATION CATALYST

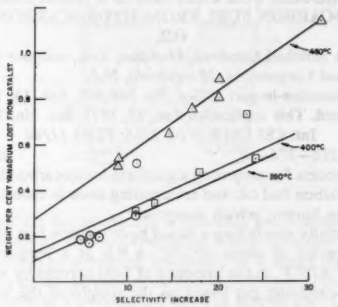
Walter Partenheimer, Naperville, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation-in-part of Ser. No. 616,370, Sep. 24, 1975, Pat. No. 4,020,174, and Ser. No. 753,551, Dec. 22, 1976. This application Apr. 21, 1977, Ser. No. 789,536

The portion of the term of this patent subsequent to Apr. 26, 1994, has been disclaimed.

Int. Cl.[2] B01J *23/92, 27/28;* **C07D** *307/60, 307/89*

U.S. Cl. 252—415 **26 Claims**



1. A process for reactivation of a phosphorus-vanadium-oxygen catalyst capable of oxidizing hydrocarbons in the presence of molecular oxygen, which catalyst has been deactivated by a loss of phosphorus during process use, which reactivation process comprises contacting said catalyst complex at reactivation conditions with an effective amount of a reactivating agent capable of removing vanadium from said catalyst by formation of a volatile vanadium compound, said reactivating agent being in the vapor phase at said reactivation conditions and selected from the group consisting of:

(A) Molecular halogens;

(B) Organic halides being in the vapor state above about 250° C at atmospheric pressure represented by the following formula:

$$(H)_mC(X)_n$$

where each X is a selected halide, n is an integer from 1 to 4 and m is an integer from 0 to 3 consistent with the value of n;

(C) Organic halides being in the vapor state above about 250° C at atmospheric pressure represented by the following formula:

$$R(X_1)m$$

where R is alkane, alkene, or alkyne of straight or branched structure having at least two carbon atoms, and X_1 is independently a primary, secondary, or tertiary halide, and m is an integer of from 1 to about 20 consistent with the number of carbon atoms of said structure; and

(D) Hydrogen halides; or mixtures thereof.

12. A process for reactivation of a deactivated phosphorus-vanadium-oxygen complex catalyst capable of oxidizing hydrocarbon in the presence of molecular oxygen which comprises contacting said catalyst complex at reactivation conditions with an effective amount of a reactivating agent which is in the vapor phase at reactivation conditions, said reactivating agent being selected from the group consisting of:

(A) Molecular halogens;

(B) Organic halides being in the vapor state above about 250° C at atmospheric pressure represented by the formula:

$$(H)_mC(X)_n$$

where each X is a selected halide, n is an integer from 1 to 4 and m is an integer from 0 to 3 consistent with the value of n;

(C) Organic halides being in the vapor state above about 250° C at atmospheric pressure represented by the following formula:

$$R(X_1)m$$

where R is alkane, alkene, or alkyne of straight or branched structure having at least two carbon atoms, and X_1 is independently a primary, secondary, or tertiary halide, and m is an integer of from 1 to about 20 consistent with the number of carbon atoms of said structure; and

(D) Hydrogen halides;

or mixtures thereof, to thereby reactivate said catalyst.

4,089,808

CATALYSTS FOR THE POLYMERIZATION OF OLEFINS, METHOD OF PREPARING THE SAME

Umberto Zucchini, Milan, and Illaro Cuffiani, Ferrara, both of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Jun. 11, 1976, Ser. No. 695,034

Claims priority, application Italy, Jun. 12, 1975, 24287 A/75; Jul. 25, 1975, 25758 A/75

Int. Cl.[2] B01J *31/02*

U.S. Cl. 252—429 C **24 Claims**

1. Components of catalysts for the polymerization of olefins consisting of the product prepared by contacting (1) a compound of Ti, V or Zr selected from the group consisting of halides, alcoholates, phenolates, acetylacetonates, and alkyl or polyoxyalkyleneglycol esters of acids derived from Ti, V or Zr, with (2) the decomposition product of a complex having the general formula

$$MX_2 \cdot nAlRX_2 \cdot pAlX_3, \qquad (I)$$

in which

M is Mg or Mn;

X is Cl or Br in the case of MX_2 and AlX_3, and Cl, Br or an alkoxy group in the case of $AlRX_2$;

R is a hydrocarbon radical containing from 1 to 20 carbon atoms;

n is a number from 1 to 4, inclusive;

p is a number from 0 to 1, inclusive; and

$1 \leqq n + p \leqq 4$,

said decomposition product comprising the dihalide MX_2.

4,089,809

REGENERABLE SORBENT AND METHOD FOR REMOVING HYDROGEN SULFIDE FROM HOT GASEOUS MIXTURES

William L. Farrior, Jr., Morgantown, W. Va., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 1, 1976, Ser. No. 646,782
Int. Cl.[2] B01J *21/08, 23/74*
U.S. Cl. 252—459 3 Claims

1. A solid sorbent for sorbing hydrogen sulfide from gaseous mixtures, said sorbent consisting essentially of a sintered admixture of Fe_2O_3 and silica particulates with the Fe_2O_3 being in the mixture in a concentration in the range of about 25–50 weight percent.

4,089,810

CATALYST

Alan Francis Diwell, and William David James Evans, both of London, England, assignors to Johnson, Matthey & Co., Limited, London, England

Continuation of Ser. No. 484,314, Jun. 28, 1974, Pat. No. 3,972,837. This application Jun. 28, 1976, Ser. No. 700,180
Claims priority, application United Kingdom, Aug. 20, 1973, 39277/73
Int. Cl.[2] B01J *23/10, 23/58, 23/64, 23/50*
U.S. Cl. 252—462 2 Claims

1. A catalyst comprising an inert unitary porous ceramic honeycomb having a layer of a first coating of a high surface area catalytically active refractory metal oxide and a second layer deposited upon said first layer, said second layer comprising a catalytically active mixed oxide containing ruthenium selected from the group consisting of oxides of the pyrochlore type $A_2B_2O_7$, the perovskite type ABO_3, the ilmenite type B_2O_3, and the spinel type AB_2O_4, wherein

A represents one or more of the cations derived from the group consisting of Na, K, Ca, Sr, Ba, Ag, Cd, Hg, Pb, Bi, Y and rare earths;

B represents Ru^{4+} and at least one other platinum group metal cation.

4,089,811

PREPARATION OF CATALYST SUPPORT

Leon F. Koniz, Poughkeepsie, and John H. Estes, Wappingers Falls, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Nov. 1, 1976, Ser. No. 737,304
Int. Cl.[2] B01J *21/04*
U.S. Cl. 252—463 19 Claims

1. The method of treating a charge alpha alumina monohydrate characterized by high purity, by substantial absence of alkali metal ions, and by presence of titanium as a principal impurity which comprises:

(i) calcining said charge alpha alumina monohydrate at temperature of about 800° F–900° F for 1–3 hours thereby forming a calcined charge alumina containing gamma alumina;

(ii) mixing said calcined charge alumina containing gamma alumina with about 2–10 times its weight of water thereby forming a wetted alumina; and

(iii) heating said wetted alumina at pH of about 6–12.5 to about 190° F–250° F for 8–24 hours thereby forming a heated alumina containing beta alumina trihydrate.

4,089,812

MASSIVE CATALYST

Stephen A. O'Hare, Vienna, Va.; James E. Mauser, Albany, and Clo Elton Armantrout, Corvallis, both of Oreg., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Continuation-in-part of Ser. No. 709,999, Jul. 30, 1976, abandoned. This application May 13, 1977, Ser. No. 796,639
Int. Cl.[2] B01J *21/04, 23/74*
U.S. Cl. 252—466 J 15 Claims

1. A method of making a catalyst consisting essentially of forming a massive nickel-aluminum alloy and treating said alloy with an alkali solution to dissolve the aluminum from a surface layer of the alloy, whereby the surface of the alloy is catalytically activated.

4,089,813

MONOLITHIC CERAMIC CAPACITORS

John Henry Alexander, Bishops Stortford, England, assignor to ITT Industries, Incorporated, New York, N.Y.

Filed Sep. 1, 1976, Ser. No. 719,880
Claims priority, application United Kingdom, Nov. 11, 1975, 46520/75
Int. Cl.[2] H01B *1/08*
U.S. Cl. 252—520 8 Claims

1. A ceramic dielectric material for use with base metal electrodes in a ceramic capacitor comprising:

from 85 to 88 mole percent barium titanate ($BaTiO_3$);

4 to 5 mole percent barium oxide (BaO);

1 to 1.5 mole percent magnesium ortho-titanate;

3 to 4.5 mole percent calcium titanate ($CaTiO_3$); and

3 to 4.5 mole percent of a zirconate selected from the group consisting of barium, calcium and strontium.

4,089,814

ROLL-ON PERFUME COMPOSITION

Irving R. Schmolka, Grosse Ile, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Jun. 10, 1974, Ser. No. 477,832
Int. Cl.[2] A61K *7/46;* C11B *9/00*
U.S. Cl. 252—522 5 Claims

1. A roll-on perfume composition comprising based on 100 parts by weight of total composition:

(a) from 5 parts to 15 parts of an essential perfume oil,

(b) from 25 parts to 40 parts of an alcohol selected from the group consisting of ethanol, propanol, isopropanol, t-butanol, sec-butanol, and n-butanol,

(c) from 20 parts to 40 parts of a polyoxyethylene polyoxypropylene block copolymer having a molecular weight of from 6550 to 40,000 represented by the formula:

$$HO(C_2H_4O)_a(C_3H_6O)_b(C_2H_4O)_aH$$

wherein *a* is an integer such that the hydrophobe represented by (C_3H_6O) has a molecular weight of from 3250 to 4000 and *b* is an integer such that the hydrophile represented by (C_2H_4O) constitutes from about 50 to 90 weight percent of the copolymer, and

(d) from 5 parts to 50 parts of water.

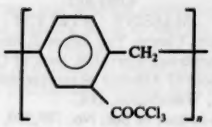
4,089,815

PHOTOPOLYMERIZATION INITIATORS

Ralph H. Reiter, and George Rosen, both of Wayne, N.J., assignors to Sun Chemical Corporation, New York, N.Y.

Division of Ser. No. 524,971, Nov. 18, 1974, Pat. No. 3,992,363, which is a division of Ser. No. 455,667, Mar. 28, 1974, Pat. No. 3,929,490. This application Feb. 24, 1976, Ser. No. 660,839
Int. Cl.[2] C08F *4/00;* C08G *6/00*
U.S. Cl. 260—2 R 1 Claim

1. Poly(trichloroacetylbenzyl) having the general structure



4,089,816

CATION EXCHANGER

Takezo Sano, Takatsuki; Akira Kobayashi, Ibaragi, and Ichiki Murase, Tokyo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Division of Ser. No. 506,023, Sep. 16, 1974, Pat. No. 3,997,644.
This application Sep. 14, 1976, Ser. No. 723,472
Claims priority, application Japan, Sep. 19, 1973, 48-106223
Int. Cl.² C08J 1/34
U.S. Cl. 260—2.2 R 4 Claims

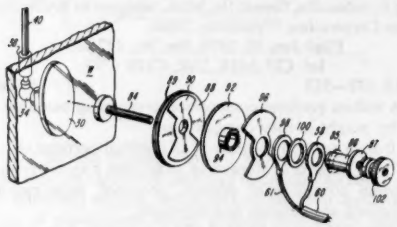
1. A cation exchanger comprising a paper-like or felt-like material made from a blend of (1) polyethylene fibers into which sulfonic groups have been incorporated and having a sulfur content of 2 to 20% by weight and (2) thermoplastic resin fibers in pulp form that are at least one member selected from the group consisting of polyethylene fibers, polypropylene fibers, and polystyrene fibers, wherein about 0.1 to about 50% by weight of said thermoplastic resin fibers is blended on the basis of the total fibers.

4,089,817

ANTENNA SYSTEM

Dennis Kirkendall, Dayton, Ohio, assignor to Stephen A. Denmar, Dayton, Ohio

Filed Oct. 12, 1976, Ser. No. 731,732
Int. Cl.² H01Q 1/32
U.S. Cl. 343—713 14 Claims



5. Apparatus providing an installation of an antenna, particularly advantageous for use in connection with a transceiver in a mobile vehicle, comprising first and second means, each of which includes electrically conductive material, adapted to be mounted, without need for mechanical fasteners, in facing relation and in respective connection with inner and outer surfaces of a portion of a structure capable of providing a dielectric therebetween, the one of said means mounting to said outer surface providing for mount of an antenna in connection with the electrically conductive material thereof which forms one plate of a capacitor, the opposite plate of which is provided by the electrically conductive material of the other of said means which mounts to said inner surface, said other of said means including a stud-like device having means mounting said opposite plate thereon for axial displacement as well as for rotation relative thereto, said one plate and said opposite plate defining, with said dielectric structure, a feed thru capacitor and said stud-like device mounting in connected relation thereto an electrically conductive plate of non-circular peripheral configuration in spaced relation to a second electrically conductive plate of non-circular configuration, to define, with an interposed dielectric material, a second capacitor, one plate of said second capacitor being connected for movement conjointly with said opposite plate, the arrangement providing that upon the connection to said stud-like device, which is of electrically conductive material, of the leads of a coaxial cable extending from a related transceiver that said one plate and said opposite plate define a feed thru capacitor in series relation with the antenna which is mounted to said one of said means mounting to said outer surface of said dielectric structure and said non-circular plates provide a shunt capacitor, the arrangement providing that both said capacitors are variable.

4,089,818

REDUCED AGING PERIOD FOR POLYETHYLENE FOAM

Robert C. Slocumb, New Brighton, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Filed Aug. 20, 1976, Ser. No. 716,250
Int. Cl.² C08J 9/14
U.S. Cl. 260—2.5 HA 10 Claims

1. In the process of forming polyethylene foam of density no greater than about 10 pounds per cubic foot by extrusion of a thermoplastic melt having a blowing agent incorporated therein and wherein foaming of the thermoplastic melt takes place immediately upon extrusion, the improvement comprising the thermoplastic melt being composed of:

(a) at least 25% by weight of a polyethylene resin having a melt index in the range of from about 0.1 to about 1.0;

(b) at least 25% by weight of a polyethylene resin having a melt index of from about 1.0 to about 10.0;

(c) the melt index of the second said resin being at least about 1.0 greater than the melt index of the first said resin;

(d) each said polyethylene resin (a) and (b) having a density of from about 0.910 to about 0.926;

(e) at least about 85% by weight of the resin portion of the thermoplastic melt being low density polyethylene resin of density from about 0.910 to about 0.926;

(f) the overall melt index of the thermoplastic melt being no greater than about 8.

4,089,819

PROCESS OF PREPARING VESICULATED POLYESTER RESIN GRANULES

Roger Hampton Coates, Vermont, and John Gillan, Noble Park, both of Australia, assignors to Dulux Australia Limited, Australia

Continuation of Ser. No. 670,942, Mar. 26, 1976, abandoned.
This application Sep. 8, 1977, Ser. No. 831,523
Claims priority, application Australia, Apr. 21, 1975, 1318/75
Int. Cl.² C08J 9/28
U.S. Cl. 260—2.5 N 6 Claims

1. A process of preparing an aqueous slurry of vesiculated polyester resin granules by stirring into water a solution of an unsaturated polyester resin in ethylenically unsaturated monomer to form an oil-in-water dispersion in the water of globules of the unsaturated polyester resin solution and then adding to the dispersion a free radical initiator to initiate co-reaction of the unsaturated polyester resin and ethylenically unsaturated monomer, the process being further characterised in that;

(1) the polyester resin shall comprise from 2–50% by weight of poly(ethylene oxide) chains of average molecular weight 1000 – 10,000, which are water soluble at the granule processing temperature and

(2) the ethylenically unsaturated monomer shall have a solubility of less than 5% by weight in water.

4,089,820

CURABLE ETHYLENE/ALPHA-MONOOLEFIN/DIENE POLYMER-UNSATURATED RUBBERY POLYMER BLENDS

Roy F. Wright, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 19, 1972, Ser. No. 219,172
Int. Cl.[2] C08L *7/00*
U.S. Cl. 260—5 1 Claim

1. A process for producing an improved sulfur curable ethylene/alpha-monoolefin/nonconjugated diene terpolymer-highly unsaturated rubbery polymer blend which comprises, before bringing together the components of the blend, treating the ethylene/alpha-monoolefin/nonconjugated diene terpolymer with a chemical promoter which is p-quinone dioxime at an elevated temperature to alter its cure rate, said promoter and temperature being effective to impart to the terpolymer a cure rate which is comparable to that of the highly unsaturated rubber polymer in the blend, and then blending the thus modified ethylene/alpha-monoolefin/nonconjugated diene terpolymer with said unsaturated rubbery polymer.

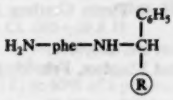
4,089,821

SYNTHESIS OF PEPTIDE AMIDES

Takashi Enkoji, Park Forest, and Martin O. Skibbe, Kankakee, both of Ill., assignors to Armour Pharmaceutical Company, Phoenix, Ariz.

Filed Mar. 31, 1976, Ser. No. 672,459
Int. Cl.[2] C08L *37/00*; C07C *103/52*; A61K *37/00*
U.S. Cl. 260—8 25 Claims

1. A resin peptide having the structure:



wherein Ⓡ is divinylbenzene crosslinked polystyrene.

4,089,822

NOVEL POLYURETHANE CURATIVE

Theodore Merriam Vial, Princeton, and Nicholas Peter Ermidis, West New York, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 567,571, Apr. 4, 1975, abandoned, which is a continuation of Ser. No. 441,715, Feb. 11, 1974, abandoned, which is a continuation of Ser. No. 364,766, May 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 276,494, Jul. 31, 1972, abandoned, which is a continuation-in-part of Ser. No. 163,082, Jul. 15, 1971, abandoned. This application May 5, 1976, Ser. No. 683,563
Int. Cl.[2] C08G *18/22*
U.S. Cl. 260—18 TN 14 Claims

1. A polyurethane elastomer comprising the reaction product of (a) a polyurethane prepolymer having terminally reactive isocyanate groups, prepared by reaction of a polymeric diol with a stoichiometric excess of 2,4-tolylene diisocyanate, 2,6-tolylene diisocyanate or a mixture of tolylene diisocyanates containing a major proportion of the 2,4-isomer, with (b) from 80 to 110% of the stoichiometrically required amount of 2,6-dichloro-p-phenylene diamine, or 2,6-dibromo-p-phenylene diamine in the presence of from about 0.01 to 1 part per hundred of prepolymer of a catalyst selected from the group consisting of mono and dicarboxylic acids, metal salts of mono and dicarboxylic acids, carboxylic acid anhydrides, and tertiary amines .

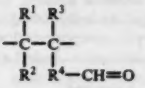
4,089,823

ALDEHYDE POLYMERS FROM PERIODIC ACID TREATMENT OF EPOXIDE POLYMERS

Jaroslav Kálal, Prague, and František Švec, Kladno, both of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Apr. 21, 1976, Ser. No. 679,024
Claims priority, application Czechoslovakia, May 6, 1975, 3139-75
Int. Cl.[2] C08F *8/06*
U.S. Cl. 260—23 EP 6 Claims

1. Polymeric solid material containing aldehyde groups which comprises units of the general formula I



(I),

where R^1, R^2 and R^3 are hydrogen, alkyl containing 1 to 5 carbon atoms, aryl, furyl, halogen, or nitrile group and R^4 is alkylene containing 1 to 20 carbon atoms, arylene, or one of the following bivalent groups: $—COO(CH_2)_n—$, $—O—(CH_2)_n—$, $—COO(CH_2)_n—CH(OH)—CH_2OCO(CH_2)_m—$, and $—(CH_2)_nOCOR^5COO(CH_2)_m—$, where n and m are integers 0 - 20 and R5 is the covalent single bond, alkylene or hydroxyalkylene containing 1 to 20 carbon atoms, or arylene.

4,089,824

HOT-MELT PRESSURE-SENSITIVE ADHESIVES BASED ON BLOCK COPOLYMERS

Klaus Bronstert, Carlsberg; Volker Ladenberger, Schwetzingen; Wolfgang Druschke, Dirmstein; Wolfgang Groh, Mannheim, and Helmut Mueller, Kaiserslautern, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Oct. 18, 1976, Ser. No. 733,525
Claims priority, application Germany, Nov. 11, 1975, 2550546
Int. Cl.[2] C08L *9/00, 9/06, 45/02, 93/04*
U.S. Cl. 260—27 BB 2 Claims

1. A hot-melt pressure-sensitive adhesive composition consisting essentially of a mixture of

(a) 100 parts by weight of a rubbery radial block copolymer with terminal non-elastomeric polymer blocks of a monovinyl-aromatic or monovinylidene-aromatic compound and butadiene-based elastomeric polymer blocks in the middle position, the olefinic double bonds of the block copolymer having been reduced to a residual content of less than 5 percent by selective hydrogenation and the elastomeric polybutadiene blocks having had, prior to hydrogenation, a 1,2-vinyl content of from 30 to 70 percent by weight, and the number-average molecular weight of the branched block copolymer being from 30,000 to 300,000,

(b) from 25 to 300 parts by weight of a tackifier resin and

(c) from 10 to 100 parts by weight of a rubber extender oil.

4,089,825

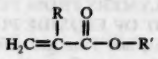
POLYACRYLATE REACTION PRODUCTS

Nelson E. Lawson, Trenton, N.J., assignor to Union Camp Corporation, Wayne, N.J.

Division of Ser. No. 604,488, Aug. 14, 1975, Pat. No. 4,035,320, Continuation-in-part of Ser. No. 274,409, Jul. 24, 1972, abandoned, and a continuation-in-part of Ser. No. 434,440, Jan. 18, 1974, abandoned. This application Dec. 22, 1976, Ser. No. 753,611
The portion of the term of this patent subsequent to Jul. 12, 1994, has been disclaimed.
Int. Cl.[2] C09D *3/40, 5/32*
U.S. Cl. 260—27 R 6 Claims

1. The polyacrylate reaction product of,

(a) an equivalent excess of an acrylic compound of the formula:



wherein R is selected from hydrogen and methyl; R′ is selected from hydrogen, methyl and ethyl; and

(b) a polyester polyol obtained by the condensation of

(i) an aliphatic polycarboxylic acid having a molecular weight of at least 325 and at least 19 carbon atoms, inclusive, said acid being a polymerized rosin; with

(ii) an equivalent excess of an aliphatic polyol having at least two hydroxyl groups and a molecular weight of between about 60 to about 250;

said reaction of (a) and (b) being under conditions wherein said acrylic compounds does not polymerize.

4,089,826

NEW CURING AGENTS FOR EPOXIDE RESINS

Noel Sydney Moss, Saffron Walden, and Michael Peter Small, Cambridge, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 28, 1975, Ser. No. 626,594

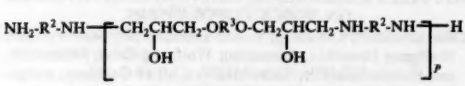
Claims priority, application United Kingdom, Nov. 6, 1974, 47970/74

Int. Cl.² C08G *59/50*; C08L *63/00*

U.S. Cl. 260—29.2 EP **9 Claims**

1. An aqueous solution comprising:

(A) an adduct of the formula



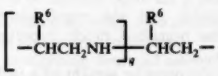
and

(B) a compound of the formula

where

R^1 represents a radical containing up to 60 carbon atoms of a polyalkylene poly(aminoamide), being such that (B) contains at least two hydrogen atoms directly attached to aliphatic amino nitrogen,

R^2 represents a group of formula



where

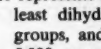
R^6 is a hydrogen atom or a methyl group, and

g is an integer of from 1 to 5,

R^3 represents the residue of an at least dihydric alcohol or at least dihydric phenol after removal of two hydroxyl groups, and having a molecular weight of from 56 to 5,000, especially from 150 to 500,

p is an integer such that its average value is from 1 to 1.5,

R^4 represents a hydrogen atom, an alkyl group of 1 to 3 carbon atoms, a phenyl group, which may be substituted by a methyl group or by a chlorine atom, or a group



where R^5 represents the residue of a monohydric aliphatic, cycloaliphatic, or araliphatic alcohol or or a monohydric phenol after removal of the sole hydroxyl group and having from 1 to 18 carbon atoms, and

(C) water, (A) and (B) together comprising from 5 to 90% by weight of the solution.

4,089,827

AQUEOUS COATING COMPOSITIONS CONTAINING A MERCAPTAN POLYESTER AND AN AMINOPLAST

Derek James Rowland Massy, Linton, and Kenneth Winterbottom, Whittlesford, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 5, 1976, Ser. No. 683,453

Claims priority, application United Kingdom, May 15, 1975, 20552/75

Int. Cl.² C08L *61/28*

U.S. Cl. 260—29.4 R **19 Claims**

1. A curable composition comprising

(i) 100 parts by weight, calculated on its resin-forming solids content, of an water soluble ammonium or amine salt of a carboxyl-containing polyester which contains, on average, at least two mercaptan groups directly attached to aliphatic carbon atoms per molecule and at least one aliphatic group of at least 8 and at most 60 carbon atoms,

(ii) from 5 to 100 parts by weight, calculated on its resin-forming solids content, of a water-soluble aminoplast containing, per average molecule, directly attached to an amido nitrogen atom or atoms of urea or of a polyamino-1,3,5-triazine, at least two groups of formula $—CH_2OR$, where R denotes a hydrogen atom or a methyl or ethyl group, and

(iii) water.

4,089,828

STABLE AQUEOUS EMULSIONS, PREPARATION AND USES THEREOF

Ramesh C. Vasishth, Delta, and Pitchaiya Chandramouli, Richmond, both of Canada, assignors to Flecto Coatings Ltd., Richmond, Canada

Filed Jan. 29, 1976, Ser. No. 653,484

Claims priority, application United Kingdom, Feb. 18, 1975, 6809/75

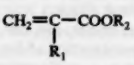
Int. Cl.² C08L *33/04*

U.S. Cl. 260—29.6 TA **26 Claims**

1. A stable aqueous emulsion having a solids loading of about 15 to 50% and consisting essentially of a continuous aqueous phase having a pH of about 5.5 to 9 and which is free from conventional emulsifiers and protective colloids and a dispersed phase which is a copolymer of

(A) at least 75% by weight of

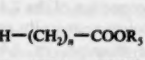
(i) at least one acrylate monomer of the formula:



where R_1 is —H or $—CH_3$ and R_2 is a straight or branched chain saturated aliphatic or cycloaliphatic group containing up to 8 carbon atoms, and

(ii) up to about 10% by weight of said acrylate monomer(s) of a copolymerizable monomer having at least one functional group selected from carboxyl, hydroxyl, amino and epoxy and/or reactive site, which is ethylenic unsaturation other than that taking part in copolymerization with said acrylate monomer(s), and

(B) up to about 25% by weight of at least one monoester of an unsaturated dicarboxylic acid of the formula:



where R_5 is a straight or branched chain saturated aliphatic or cycloaliphatic group of at least 3 carbon atoms, n and m are each 0 or 1 and $n+m$ is 0 or 1,

said copolymer having a substantially uniform particle size in the range of about 10 to 3000 Angstroms.

4,089,829

PROCESS FOR THE MANUFACTURE OF PLASTICS DISPERSIONS

Helmut Braun, Hofheim, Taunus; Helmut Rinno, Lorsbach, Taunus; Rolf Reinecke, Wiesbaden; Werner Stelzel, Bad Soden, Taunus, and Wolfgang Winstel, Florsheim am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 29, 1975, Ser. No. 626,983

Claims priority, application Germany, Oct. 31, 1974, 2451772

Int. Cl.[2] C08L *33/08*

U.S. Cl. 260—29.6 T **5 Claims**

1. A process for making a plastics dispersion suitable for use in dispersion paints having a high wet adhesion which comprises the steps of copolymerizing in an aqueous medium one or more mono-olefinically unsaturated monomers and from 0.5 to 10% by weight, based on the total weight of monomers, of a glycidyl ester of an olefinically unsaturated carboxylic acid, and adding to the resulting dispersion, while maintaining it at a temperature above 50° C., at least one mole per mole of glycidyl groups of the polymer of an alkaline agent selected from ammonia and hexamethylene tetramine.

4,089,830

SETTING SOLUTION FOR DENTAL GLASS IONOMER CEMENTS

Chojiro Tezuka, Tokyo, and Yoshimitsu Karasawa, Takasaki, both of Japan, assignors to G-C Dental Industrial Corp., Tokyo, Japan

Filed Oct. 8, 1976, Ser. No. 731,470

Claims priority, application Japan, Feb. 24, 1976, 51-18480

Int. Cl.[2] C08K *3/40*

U.S. Cl. 260—29.6 H **3 Claims**

1. An aqueous setting solution for dental ionomer cements comprising:

(a) 45 to 60% of a polymer having a molecular weight of less than 30,000 and selected from the group consisting of polyacrylic acid and a copolymer of acrylic acid and at least one monomer selected from the group consisting of 2-chloroacrylic acid, 2-bromoacrylic acid, maleic acid, fumaric acid, itaconic acid, methacrylic acid, mesaconic acid, acrylonitrile, methyl acrylate, methyl methacrylate, vinyl acetate, vinyl propionate, methyl itaconate, styrene and 2-hydroxylethyl methacrylate; and

(B) 7–25% of polybasic carboxylic acid selected from the group consisting of citric acid, maleic acid, malic acid, tartaric acid, itaconic acid, aconitic acid and tricarballic acid.

4,089,831

COMPOSITION AND METHOD FOR DISPERSING FLOCCULANT POLYMERS

Byron C. Chambers, Wauconda, Ill., assignor to Chemed Corporation, Cincinnati, Ohio

Continuation-in-part of Ser. No. 630,869, Nov. 11, 1975. This application Apr. 19, 1977, Ser. No. 788,703

Int. Cl.[2] C08L *33/26*

U.S. Cl. 260—29.6 SQ **14 Claims**

1. A free-flowing powder composition for preparing solutions of high molecular weight polymers or copolymers, such solutions to be used in treating water and waste systems, which consists essentially of a combination of flocculant polymers or copolymers blended with an inert additive and a small amount of water; wherein based on weight of flocculant, the inert additive is about 10 percent to 80 percent and the amount of water is about one-tenth percent to twenty percent; said composition, when added to water, producing slowing of the rate of solution of the flocculant, allowing time for dispersion and separation of the solid particles, thereby expediting final solution and preventing the formation of agglomerates of the polymers or copolymers.

4,089,832

WATER-CONTAINING PLASTIC COMPOSITION

Aizo Yamauchi, Atsugi, and Yasushi Watanabe, Aikawa, both of Japan, assignors to Director-General of the Agency of Industrial Science & Technology, Tokyo, Japan

Filed Sep. 17, 1974, Ser. No. 506,834

Claims priority, application Japan, Sep. 18, 1973, 48-105196; Sep. 18, 1973, 48-105197

Int. Cl.[2] C08L *33/04*

U.S. Cl. 260—29.6 WA **11 Claims**

1. A method of making a solid water-containing plastic compositon which comprises mixing about 10–90 wt. % of particles of

a gel of a cross-linked, water-soluble polymer of an α,β-ethylenically unsaturated monomer having water entrained therein in a weight ratio of about 1-10:1 relative to such polymer, with about 90–10 wt. % of a thermoplastic or thermohardenable plastic in fluent form, molding said mixture to a desired shape, and hardening said plastic while the mixture retains said shape.

4,089,833

PROCESS AIDS FOR FLUOROSILICONE POLYMERS

Verne G. Simpson, Clifton Park, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed May 2, 1977, Ser. No. 793,226

Int. Cl.[2] C08K *5/54*; C08G *77/00, 77/04*

U.S. Cl. 260—29.15 B **35 Claims**

1. A fluorosilicone composition that has superior resistance to sticking to processing equipment, comprising a base diorganopolysiloxane polymer having a viscosity in the range of 500,000 to 200,000,000 centipoise at 25° C wherein the organo groups are selected from the class consisting of alkyl radicals of 1 to 3 carbon atoms, vinyl radicals, phenyl radicals and 3,3,3 trifluoropropyl radicals and mixtures thereof wherein the concentrations of the trifluoroproyl radical varies from 5 to 50 mole percent and consisting of non-halogenated process aids, one of which must be a diorganopolysiloxane having a viscosity varying from 100,000 to 10,000,000 centipoise at 25° C wherein the organo groups are selected from alkyl radicals, vinyl radicals, phenyl radicals and mixtures thereof and wherein the vinyl unsaturation varies from 5 to 25 weight percent.

4,089,834

WATER-RESISTANT MICRO-CAPSULAR OPACIFIER SYSTEM AND PRODUCTS

Mabrin P. Powell, Chicago, Ill., assignor to Champion International Corporation, Stamford, Conn.

Division of Ser. No. 55,925, Jul. 17, 1970, Pat. No. 3,779,941. This application Jan. 11, 1973, Ser. No. 322,629

Int. Cl.[2] C08L *61/20*

U.S. Cl. 260—29.4 UA **11 Claims**

1. A paint formulation comprising pigment and a liquid vehicle, wherein the improvement comprises providing said paint formulation with organic pigment in the form of microcapsular opacifying agents, said microcapsular opacifying agents being produced by a process which comprises admixing

(a) an oily solution comprising an oil-soluble, partially-condensed thermosetting condensation product in a water-immiscible oily material; and

(b) an aqueous solution of a water-soluble polymeric material;

thereby forming an emulsion, said thermosetting condensation product and said water-soluble polymeric material being capable of interacting to form a solid, resinous material, subjecting said emulsion to conditions whereby said polymeric materials react to form precursor microcapsules having solid capsular walls about a nucleus of said oily material, and activating said

microcapsules to provide microcapsular opacifying agents by expelling said oily core material and replacing said oily core material with air.

4,089,835

STABLE POLYURETHANE DISPERSIONS AND PROCESS FOR PRODUCTION THEREOF

Klaus König, and Manfred Dietrich, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of Ser. No. 578,050, May 15, 1975, abandoned. This application May 28, 1976, Ser. No. 691,174

Claims priority, application Germany, Mar. 27, 1975, 2513815; Nov. 12, 1975, 2550833; Nov. 12, 1975, 2550862

Int. Cl.[2] C08K *5/11;* **C08G** *18/12, 18/32*

U.S. Cl. 260—31.6 **22 Claims**

1. A process for the in situ production of stable dispersions of polyureas and/or polyhydrazodicarbonamides in a hydroxyl group containing material selected from the group consisting of polyethers, polyesters, polyester amides, polycarbonates and mixtures thereof, by reacting:

(1) organic polyisocyanates, with

(2) polyamines containing primary and/or secondary amino groups and/or hydrazines and/or hydrazides, in

(3) said hydroxyl group containing material; wherein components (1), (2) and (3) are continuously introduced into a flow mixer in such a quantity that the average residence time in the mixer is less than 10 minutes, the equivalent ratio between components (1) and (2) being from 0.8:1 to 1.05:1, and the reaction product issuing from the flow mixer is subsequently collected in a receiver, said stable dispersions having a solids content of from 1 to 35% by weight.

12. Stable dispersions of polyureas and/or polyhydrazodicarbonamides in hydroxyl group containing materials selected from the group consisting of polyethers, polyesters, polyester amides, polycarbonates and mixtures thereof, obtained by reacting:

(1) organic polyisocyanates, with

(2) polyamines containing primary and/or secondary amino groups and/or hydrazines and/or hydrazides in

(3) said hydroxyl group containing material, by continuously introducing components (1), (2) and (3) into a flow mixer in such a quantity that the average residence time in the mixer is less than 10 minutes, the equivalent ratio between components (1) and (2) being from 0.8:1 to 1.05:1, and subsequently collecting the reaction product issuing from the flow mixer in a receiver, said stable dispersions having a solids content of from a 1 to 35% by weight.

4,089,836

PROCESS FOR THE COLORATION OF POLYAMIDES WITH PIGMENTS DERIVED FROM CARBOXYAMIDO-POLYIMIDES

Philippe Yves Edouard Gangneux, Bihorel, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

Continuation of Ser. No. 330,344, Feb. 7, 1973, abandoned, and a continuation of Ser. No. 330,332, Feb. 7, 1973, Pat. No. 4,002,591. This application Aug. 4, 1975, Ser. No. 601,960

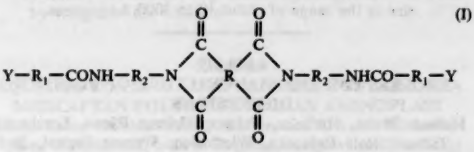
Claims priority, application France, Feb. 7, 1972, 72.03975; Feb. 7, 1972, 72.03976

The portion of the term of this patent subsequent to Jan. 11, 1994, has been disclaimed.

Int. Cl.[2] C08K *5/34*

U.S. Cl. 260—37 N **10 Claims**

1. Process for the coloration of a linear polyamide which comprises effecting polycondensation of at least one amide monomer and a pigment that is insoluble in organic solvents, said pigment being of the polycyclic polycarboximide series containing 2 primary amine or haloformyl functional groups, wherein the pigment has the formula:



(I)

wherein R represents the tetravalent residue of a substituted mono- or poly-cyclic aromatic hydrocarbon or a substituted or unsubstituted perinone, R_1 represents a substituted or unsubstituted aliphatic, benzene, naphthalene or heterocyclic radical, R_2 represents a substituted or unsubstituted aliphatic, aromatic or heterocyclic radical and Y represents an amino or haloformyl group; said pigment being copolycondensed in the polymer chain of said polyamide; wherein the proportion of said pigment is from 1%. (1 to 1000) to 2% (2 per 100) by weight of the monomer or monomers; and said at least one monomer is selected from the group consisting of 11-amino-undecanoic acid; ϵ-caprolactam; p-phenylenediamine, decamethylenediamine or hexamethylenediamine together with terephthalic, isophthalic, adipic or sebacic acid.

4,089,837

SHELL MOLDING PROCESS AND COMPOSITION

Manfred Luttinger, Columbus; George E. Cremeans, Grove Port, and Louis J. Nowacki, Columbus, all of Ohio, assignors to Manley Bros. of Indiana, Inc., Chesterton, Ind. and Borden, Inc., Columbus, Ohio, a part interest to each

Filed Mar. 7, 1977, Ser. No. 775,247

Int. Cl.[2] C08K *3/36*

U.S. Cl. 260—38 **12 Claims**

1. A composition for the shell process comprising an admixture of sand, a phenol-formaldehyde novalak resin, a curing agent for the resin and a small but effective amount of resorcinol sufficient to reduce the cycle time of the shell process.

4,069,838

POLYPIVALOLACTONE MOLDING COMPOUNDS

Edwin D. Hornbaker; Jesse D. Jones; Michael E. Kucsma, and Thomas S. Allen, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Jul. 18, 1977, Ser. No. 816,592

Int. Cl.[2] C08K *3/10*

U.S. Cl. 260—40 R **40 Claims**

1. A thermoplastic composition comprising an intimate blend of polypivalolactone, said polypivalolactone has an LVN of from about 0.8 to about 2.5, a particulate reinforcing filler said particulate reinforcing filler has a maximum particle size of about 900 microns, a maximum average particle size of about 400 microns or less, and an average aspect ratio of at least 10, and a coupling agent having the formula

where X is a hydrolyzable group capable of reaction with a hydroxyl group, Y is hydrogen or a monovalent hydrocarbon group, R is a divalent hydrocarbon group having from 1 to about 20 carbon atoms, Z is a primary or secondary amino or epoxy group, "*a*" is an integer from 1 to 3, "*b*" is an integer from 0 to 2, "*c*" is an integer from 1 to 3, and the sum of $a + b + c = 4$, said coupling agent comprising from about 0.05 to about 2 weight percent based on the total weight of said composition, and said particulate reinforcing filler comprising from about 10 to about 60 weight percent based on the total weight of said compositions.

4,089,839

5-CHLORO-2-(2'-HYDROXY-5'-TERT-OCTYLPHENYL)-BENZOTRIAZOLE AND POLYPROPYLENE STABILIZED THEREWITH

Elmar Harry Jancis, Naugatuck, Conn., assignor to Uniroyal, Inc., New York, N.Y.

Division of Ser. No. 418,135, Nov. 21, 1973, Pat. No. 3,978,074. This application Jun. 7, 1976, Ser. No. 693,568
Int. Cl.[2] C08K 5/34; C07D 249/20, 401/04
U.S. Cl. 260—45.8 NT 2 Claims

1. 5-Chloro-2-(2'-hydroxy-5'-tert-octylphenyl)benzotriazole.

2. Polypropylene containing, as a stabilizer, from 0.01 to 5% by weight of the compound recited in claim 1.

4,089,840

PROCESS FOR THE PRODUCTION OF EPOXY SILICATE RESINOUS PRODUCTS

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 678,196, Apr. 19, 1976, Pat. No. 4,036,787. This application Jun. 22, 1977, Ser. No. 808,818
Int. Cl.[2] C08G 77/04
U.S. Cl. 260—46.5 R 16 Claims

1. The process for the production of epoxy silicate resinous products by the following steps:

(a) adding about 20 parts by weight of a fine granular silica (SiO_2);

(b) mixing therewith a catalytic amount of an organic amine compound;

(c) mixing therewith 10 to 30 parts by weight of an organic epoxy compound having at least one epoxy group;

(d) agitating the mixture until the resulting chemical reaction is complete.

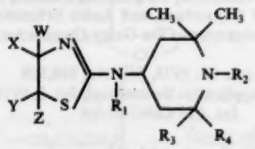
4,089,841

THIAZOLINYLAMINO-PIPERIDINE DERIVATIVES

Reinhard Lantzsch; Paul Uhrhan, both of Cologne; Harald Oertel; Ernst Roos, both of Odenthal, and Dieter Arlt, Cologne, all of Germany, assignors to Bayer AG, Leverkusen, Germany

Filed Oct. 6, 1976, Ser. No. 730,203
Claims priority, application Germany, Oct. 11, 1975, 2545645
Int. Cl.[2] C07D 419/12
U.S. Cl. 260—45.8 SN 9 Claims

1. Thiazolinylamino-piperidine compounds corresponding to the general formula (I):

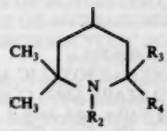


(I)

in which

the radicals W, X, Y and Z are the same or different and each represent H, a straight-chain or branched alkyl radical having 1 to 12 carbon atoms which may optionally be substituted by 1 to 3 chlorine atoms, in addition to which the radicals X and Y may also form with the carbon atoms in the 4- and 5-positions of the thiazoline ring, a cycloalkyl ring having 5 to 8 or 12 ring carbon atoms.,

R_1 represents H, a straight-chain or branched alkyl radical having 1 to 20 carbon atoms, a cycloalkyl radical having 5 to 12 carbon atoms, an aralkyl radical having 7 to 12 carbon atoms, a β-cyanoethyl radical, a β-alkoxy carbonyl ethyl radical having 1 to 3 carbon atoms in the alkoxy moiety, an aryl radical having 6 to 14 carbon atoms, the group $—CH_2—CHR_5—OH$ where R_5 represents H, methyl or phenyl, or corresponds to the formula (II):

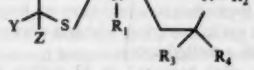


(II)

in which R_2 represents H, a straight-chain or branched alkyl radical having 1 to 20 carbon atoms, an alkenyl or alkynyl radical having 3 to 12 carbon atoms, an aralkyl radical having 7 to 12 carbon atoms or the $—CH_2—CHR_5—OH$ where R_5 represents H, methyl or phenyl, and, R_3 and R_4 are the same or different and each represent a straight-chain or branched alkyl radical having 1 to 12 carbon atoms or, together with the ring carbon atom to which they are attached, form a cycloalkyl ring having 5 to 12 carbon atoms, and

R_2, R_3 and R_4 in formula (I) have the same meaning as R_2, R_3 and R_4 in formula (II).

7. A process for stabilising synthetic polymers, wherein the polymers have added to them active quantities of thiazolinylamino-piperidine derivatives corresponding to the formula (I):

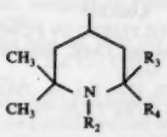


(I)

in which

the radicals W, X, Y and Z are the same or different and each represent H, a straight-chain or branched alkyl radical having 1 to 12 carbon atoms which may optionally be substituted by 1 to 3 chlorine atoms, in addition to which the radicals X and Y may also form with the carbon atoms in the 4- and 5-positions of the thiazoline ring a cycloalkyl ring having 5 to 8 or 12 ring carbon atoms,

R_1 represents H, a straight-chain or branched alkyl radical having 1 to 20 carbon atoms, a cycloalkyl radical having 5 to 12 carbon atoms, an aralkyl radical having 7 to 12 carbon atoms, a β-cyanoethyl radical, a β-alkoxy carbonyl ethyl radical having 1 to 3 carbon atoms in the alkoxy moiety, an aryl radical having 6 to 14 carbon atoms, the group $—CH_2—CHR_5—OH$ where R_5 represents H, methyl or phenyl, or corresponds to the formula (II):



(II)

in which R_2 represents H, a straight-chain or branched alkyl radical having 1 to 20 carbon atoms, an alkenyl or alkynyl radical having 3 to 12 carbon atoms, an aralkyl radical having 7 to 12 carbon atoms or the group $—CH_2—CHR_5—OH$ where R_5 represents H, methyl or phenyl, and R_3 and R_4 are the same or different and each represent a straight-chain or branched alkyl radical having 1 to 12 carbon atoms or, together with the ring carbon atom to which they are attached, form a cycloalkyl ring having 5 to 12 ring carbon atoms, and

R_2, R_3 and R_4 in formula (I) have the same meaning as R_2, R_3 and R_4 in formula (II).

9. Synthetic polymers stabilised by the process claimed in claim 7.

4,089,842

HINDERED PIPERIDINE CARBOXYLIC ACIDS, METAL SALTS THEREOF AND STABILIZED COMPOSITIONS

Chester E. Ramey, Spring Valley, and John J. Luzzi, Carmel, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

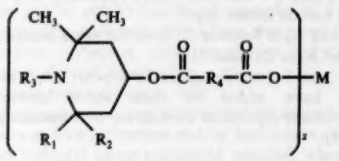
Continuation-in-part of Ser. No. 429,232, Dec. 28, 1973, Pat. No. 3,920,661. This application Sep. 22, 1975, Ser. No. 615,641

The portion of the term of this patent subsequent to Jun. 21, 1994, has been disclaimed.

Int. Cl.[2] C07D *221/20;* C08K *5/34*

U.S. Cl. 260—45.75 C **16 Claims**

1. A compound of the formula



wherein

R_1 and R_2 independently of each other are straight- or branched-chain alkyl having from 1 to 6 carbon atoms, or together with the carbon to which they are bound form a cyclopentyl or cyclohexyl ring, which is unsubstituted or substituted with a methyl group,

R_3 is hydrogen, alkyl having 1 to 12 carbon atoms, β-methoxyethyl, alkenyl having 3 or 4 carbon atoms, propargyl, benzyl, or alkyl substituted benzyl,

R_4 is straight- or branched-chain alkylene having 5 to 8 carbon atoms, or the group $(CH_2)_mY(CH_2)_n$ wherein Y is oxygen or sulfur and m and n independently of each other are an integer of from 1 to 3,

M is a metal selected from the group consisting of barium, calcium, magensium, sodium, potassium and copper, and the value of z is the same as the valence of M.

13. A composition of matter stabilized against ultraviolet deterioration which comprises a synthetic organic polymer normally subject to ultraviolet deterioration containing from

(a) 0.005% to 5% of a stabilizing compound according to claim 1,

(b) 0 to 5% of a phenolic antioxidant,

(c) 0 to 5% of a thio co-stabilizer, and

(d) 0 to 5% of a U.V. absorber.

4,089,843

PRECIPITATING POLYMERS IN POWDER FORM

Karl W. Rausch, Jr., Hamden, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Sep. 20, 1976, Ser. No. 724,583

Int. Cl.[2] C08G *65/46, 75/20, 73/10, 73/14*

U.S. Cl. 260—65 **10 Claims**

1. A process for the conversion of a solid polymer which is soluble in dipolar solvents to a powder having particles which are substantially spherical and uniform in size which process comprises:

(a) providing a solution containing from about 5 to about 50 percent by weight of said polymer in a polar solvent which is miscible with water but immiscible with mineral oil;

(b) emulsifying said polymer solution in from 1 to 10 times its own volume of mineral oil;

(c) adding to said emulsion, with agitation, from 0.1 parts by volume to equal parts by volume of a liquid in which said polymer is insoluble; and

(d) separating from said product the powdered polymer which has been deposited.

4,089,844

BLOCKED POLYISOCYANATE AND METHOD

Ivan H. Tsou, Bloomfield Hills, Mich., assignor to Grow Chemical Corp., New York, N.Y.

Continuation-in-part of Ser. No. 481,884, Jun. 21, 1974, abandoned, and a continuation-in-part of Ser. No. 496,066, Aug. 9, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,505

Int. Cl.[2] C08G *18/62, 18/80;* C08L *75/04*

U.S. Cl. 260—77.5 CR **8 Claims**

1. A process for producing a blocked polyisocyanate comprising the steps:

1. Reacting isophorone diisocyanate with a blocking agent and interrupting the reaction prior to completion by allowing about 45–50% of the charged isocyanate to react thereby blocking about 90–100% of the more reactive isocyanato group;

2. Reacting the product of Step 1 with a polyfunctional agent, which agent is an internal plasticizing agent for a polymerized resin having isocyanate reactive functionality after curing of the resin and an external plasticizing agent prior to curing of the resin wherein said polyfunctional agent is a compound containing at least four carbon atoms and the functional groups are hydroxyl groups which are separated from each other by at least one carbon atom; wherein the number of isocyanato groups of the product of Step 1 is in excess of the number of hydroxyl groups present in the plasticizing agent;

3. Determining the free isocyanate content of the product of Step 2; and

4. Then reacting an amount of said polyfunctional agent sufficient to react with the unreacted isocyanato groups.

4,089,845

THERMOSETTING MIXTURES WHICH ARE STABLE ON STORAGE FROM POLYIMIDE AND β-AMINO-CROTONIC ACID

Theobald Haug, Frenkendorf; Jurg Kiefer, Reinach; Peter Ruf, Binningen, all of Switzerland, and Andre Schmitter, Hegenheim, France, assignors to Ciba-Geigy Corporation, Ardsely, N.Y.

Filed Jun. 19, 1975, Ser. No. 588,529

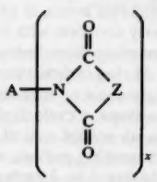
Claims priority, application Switzerland, Jul. 2, 1974, 9050/74

Int. Cl.[2] C08G *69/08*

U.S. Cl. 260—78 A **10 Claims**

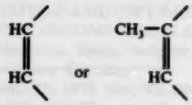
1. A storage-stable, heat-curable thermosetting composition of matter, which consists essentially of

(a) a polyimide of a saturated dicarboxylic acid of formula I



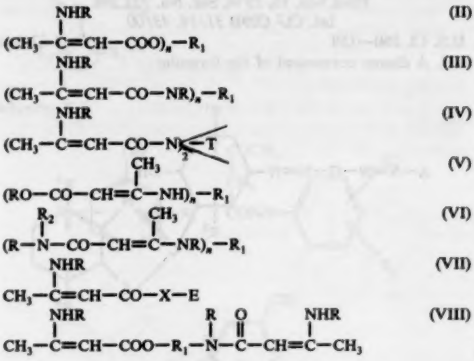
(I)

wherein A denotes a x-valent organic radical of at least 2 and at most 30 carbon atoms, Z denotes a radical of the formula



and x denotes the number 2 or 3, or a mixture of said polyimides, and

(b) a β-aminocrotonic acid derivative or mixture of said derivatives selected from the group consisting of those of the formulae II to VIII



(II)

(III)

(IV)

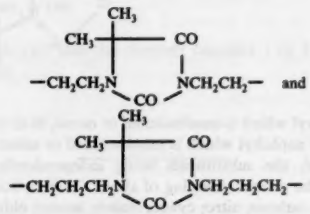
(V)

(VI)

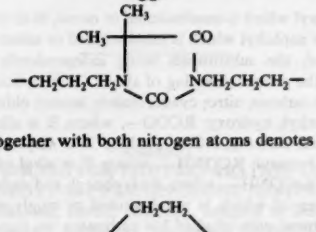
(VII)

(VIII)

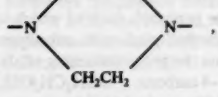
wherein each of R and R_2 denotes a hydrogen atom, a linear, branched or cyclic hydrocarbon radical having up to 9 carbon atoms, R_1 denotes a n-valent linear, branched or cyclic hydrocarbon radical having up to 20 carbon atoms or a heterocyclic radical selected from the group consisting of



and



T together with both nitrogen atoms denotes



X denotes an oxygen atom or the —NH— group, E denotes the allyl or furfuryl radical which is suitable to undergo polymerization reactions, n is a number from 2 to 4, and wherein said composition contains 0.25 to 1.0 equivalent of β-aminocrotonyl groups (b) per each 1.0 equivalent of imide groups.

4,089,846

POLYSALTS OF ACID-ESTER COMPOUNDS WITH HYDRAZINE OR HYDRAZIDES AND METHOD OF PREPARING HETEROCYCLIC POLYMERS FROM SAID POLYSALTS

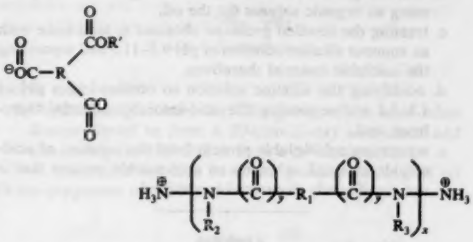
Karl F. Schimmel, Verona, and Marco Wismer, Gibsonia, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 511,337, Oct. 2, 1974, Pat. No. 3,969,566, which is a division of Ser. No. 369,629, Jun. 13, 1973, Pat. No. 3,882,086. This application Nov. 4, 1975, Ser. No. 628,611

Int. Cl.[2] **C07C** *109/04, 109/087, 109/10;* **C08G** *73/08*

U.S. Cl. 260—78 TF **3 Claims**

1. A polysalt consisting of the repeating structural formula:



wherein R is a trivalent organic radical having at least three carbon atoms, R′ is a monovalent alkyl, cyloalkyl or alkenyl radical having 1 to 20 carbon atoms, R_1 is a divalent organic radical selected from the group consisting essentially of alkylene, arylene and heterocyclic, R_2 and R_3 are monovalent alkyl, aryl, aralkyl, cycloalkyl or hydrogen radicals and x and y are either 1 or 0.

4,089,847

TEMPERATURE PROGRAMMING IN THE PRODUCTION OF ARYLENE SULFIDE POLYMERS

James T. Edmonds, Jr., and Robert W. Campbell, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 30, 1976, Ser. No. 671,773

Int. Cl.[2] **C08G** *75/16*

U.S. Cl. 260—79.1 **10 Claims**

1. In the production of an arylene sulfide polymer by reacting (1) at least one p-dihalobenzene or at least one p-dihalobenzene together with at least one polyhalo aromatic compound having more than two halogen substituents per molecule with (2) a mixture in which (a) at least one alkali metal sulfide, (b) at least one alkali metal carboxylate, (c) at least one base selected from alkali metal hydroxides and alkali metal carbonates, and (d) at least one organic amide are contacted a method in which the reaction of halogenated aromatic compound with said mixture is conducted in a profile of selected temperature ranges within the range of polymerization reaction temperature for the process and wherein the temperature during at least 50 percent of the reaction time in a first selected temperature range is at least 20° C below the final temperature in a second selected temperature range.

4,089,848

EXTRACTION OF PROTEIN FOOD VALUES FROM OATS

Albert Bell, Elginburg; John Roger Brooke Boocock, Kingston, and Richard Walton Oughton, Odessa, all of Canada, assignors to Du Pont of Canada Limited, Montreal, Canada

Filed Feb. 2, 1976, Ser. No. 654,163

Claims priority, application United Kingdom, Feb. 6, 1975, 5055/75

Int. Cl.[2] A23J *1/00, 1/12;* C07G *7/00*

U.S. Cl. 260—112 R 14 Claims

1. A process for the separation of acid-soluble protein from oats comprising the steps of:

a. comminuting dehulled oats,

b. extracting oil from the comminuted groats so obtained using an organic solvent for the oil,

c. treating the de-oiled groats so obtained at least once with an aqueous alkaline solution of pH 9.5–11.5 and separating the insoluble material therefrom,

d. acidifying the alkaline solution so obtained to a pH of 1.8–3.2 and separating the acid-insoluble material therefrom, and

e. separating acid-soluble protein from the solution of acid-soluble material, whereby an acid-soluble protein that is not significantly denatured is obtained.

4,089,849

MONOAZO DYES HAVING A BENZTHIAZOLYL SUBSTITUTED PHENOL OR NAPHTHOL COUPLING COMPONENT

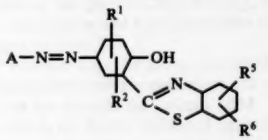
Raouf Botros, Beech Creek, Pa., assignor to American Color & Chemical Corporation, Charlotte, N.C.

Filed Sep. 10, 1976, Ser. No. 722,204

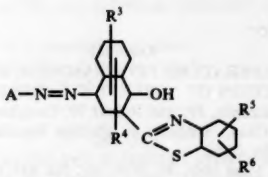
Int. Cl.[2] C09B *29/36, 43/00*

U.S. Cl. 260—158 12 Claims

1. An azo compound of the formula:



or



wherein

A is phenyl which is unsubstituted or mono, di or trisubstituted, or naphthyl which is unsubstituted or mono or disubstituted, the substituents being independently selected from the group consisting of alkyl of 1–4 carbon atoms; alkoxy of 1–4 carbon atoms; nitro; cyano; fluoro; chloro; bromo; trifluoromethyl; hydroxy; RCOO—, where R is alkyl of 1–4 carbons; carboxy; ROOC—, where R is alkyl of 1–4 carbons; RCO—, where R is alkyl of 1–4 carbons; benzoyl; RCONH—, where R is alkyl of 1–4 carbons; ArCONH—, where Ar is phenyl; and carbamyl, the nitrogen of which is unsubstituted or singly or doubly substituted with alkyl of 1–4 carbons;

R^1, R^2, R^3 and R^4 are independently selected from the group consisting of hydrogen; alkyl of 1–4 carbons; alkoxy of 1–4 carbons; cyano; fluorine; chlorine and bromine; and

R^5 and R^6 are independently selected from the group consisting of hydrogen; alkyl of 1–4 carbons; alkoxy of 1–4 carbons; nitro; chlorine and bromine.

4,089,850

DISAZO DYES HAVING A BENZTHIAZOLYL SUBSTITUTED PHENOL OR NAPHTHOL COUPLING COMPONENT

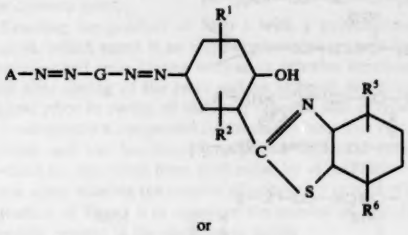
Raouf Botros, Beech Creek, Pa., assignor to American Color & Chemical Corporation, Charlotte, N.C.

Filed Sep. 10, 1976, Ser. No. 722,205

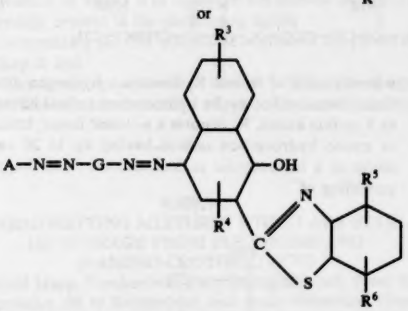
Int. Cl.[2] C09B *31/14, 43/00*

U.S. Cl. 260—158 4 Claims

1. A disazo compound of the formula:



or



wherein:

A is phenyl which is unsubstituted or mono, di or trisubstituted, or naphthyl which is unsubstituted or mono or disubstituted, the substituents being independently selected from the group consisting of alkyl of 1–4 carbons; alkoxy of 1–4 carbons; nitro; cyano; fluoro; bromo; chloro; trifluoromethyl; hydroxy; RCOO—, where R is alkyl of 1–4 carbons; carboxy; RCO—, where R is alkyl of 1–4 carbons; benzoyl; RCONH—, where R is alkyl of 1–4 carbons; ArCONH—, where Ar is phenyl; and carbamyl, the nitrogen of which is unsubstituted or singly or doubly substituted with alkyl of 1–4 carbons;

G is phenyl or naphthyl, each of which is unsubstituted or mono or disubstituted with substituents independently selected from the group consisting of alkyl of 1–4 carbons; alkoxy of 1–4 carbons; $—OCH_2CH_2OH$; $—OCH_2CH_2CN$; chloro and bromo;

R^1, R^2, R^3 and R^4 are independently selected from the group consisting of hydrogen; alkyl of 1–4 carbons; alkoxy of 1–4 carbons; nitro; chloro and bromo; and

R^5 and R^6 are independently selected from the group consisting of hydrogen; alkyl of 1–4 carbons; alkoxy of 1–4 carbons; nitro; cyano; chloro and bromo.

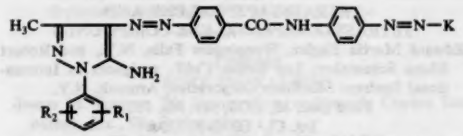
4,089,851

SULFO CONTAINING DISAZO DYESTUFFS DERIVED FROM DIAZOTIZED 4,4'-DIAMINOBENZANILIDE, A 1-PHENYL-3-METHYL-5-AMINOPYRAZOLE COUPLER AND A SECOND COUPLER

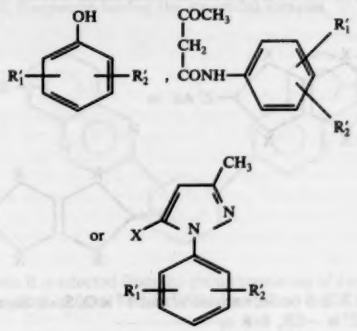
Hans Kramb, de Barcelona, Spain, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jun. 15, 1976, Ser. No. 696,299
Claims priority, application Germany, Jun. 19, 1975, 2527395
Int. Cl.[2] C09B *31/28;* D06P *1/39, 3/24;* D21H *1/46*
U.S. Cl. 260—160 1 Claim

1. Dyestuff which in the form of the free acid corresponds to the formula



wherein K is



R_1, R_2, R_1' and R_2' is hydrogen, C_1–C_4-alkoxy, C_1–C_4-alkyl, halogen or sulpho, and

X is NH_2 or OH

with the proviso that the dyestuff contains 1 or 2 sulphonic acid groups.

4,089,852

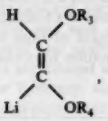
PROCESS FOR THE PREPARATION OF 21-HYDROXY-16-PREGNEN-20-ONE DERIVATIVES

Robert Nickolson, Berlin, Germany, assignor to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

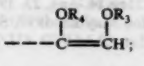
Filed May 4, 1976, Ser. No. 682,967
Claims priority, application Germany, May 9, 1975, 2521231
Int. Cl.[2] C07J *17/00*
U.S. Cl. 260—239.55 R 9 Claims

1. A method of preparing Δ^{16}-21-hydroxy-20-keto steroids of the pregnane series having a 13-methyl or -ethyl group and an otherwise unsubstituted D-ring, and 21-ethers thereof, comprising the steps of

(a) condensing a corresponding 17-keto steroid containing no other free keto function with a lithium compound of the formula



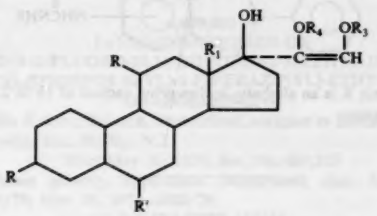
wherein R_3 and R_4 each are alkyl of 1–4 carbon atoms or collectively are alkylene or alkylidene of 1–3 carbons in the alkylene or alkylidene chain and up to 6 carbon atoms in the alkylene or alkylidene, thereby converting the 17-keto group to a 17β-hydroxy-20α-enol ether in which the 17α-side-chain has the formula



and, in either order,

(b) hydrolyzing at least the OR_4 group of the enol ether thus-produced to form a 20-keto-21-oxy side chain and eliminating the 17β-OH to form a Δ^{16}-double bond.

7. A compound selected from the group consisting of (a) 19-nor-pregnanes of the formula



wherein R' is a hydrogen atom or methyl; R is a hydrogen atom or a substituent selected from the group consisting of hydroxy, alkoxy of 1–6 carbon atoms, acyloxy of 1–6 carbon atoms, trialkylsilyloxy of 1–3 carbon atoms in each alkyl group, tetrahydropyranyloxy, alkylenedioxy of 2–6 carbon atoms and forming a 5–6 membered ring and phenylenedioxy; R_1 is methyl or ethyl; and R_3 and R_4 each are alkyl of 1–4 carbon atoms or collectively are alkylene or alkylidene of up to 6 carbon atoms forming a 5 or 6 membered ring; (b) the corresponding 10-methyl-pregnanes, (c) unsaturated pregnanes and 19-nor-pregnanes corresponding to (a) and (b) having a 9(11) double bond; (d) unsaturated pregnanes corresponding to (a), (b) and (c) having, when R at the 3-position is β-hydroxy or ketalized oxo, either a 5(6) or 5(10) double bond; and (e) unsaturated pregnanes corresponding to (a), (b) and (c) having, when R at the 3-position is an esterified or etherified hydroxy, a double bond in the 1,3,5(10-, 2,5(10)-, 3-, 5- or 3,5-positions.

4,089,853

PROCESS FOR THE PREPARATION OF CIS-5,6-DIMETHOXY-2-METHYL-3-[2-(4-PHENYL-1-PIPERAZINYL)-ETHYL]INDOLINE

Anthony Edward Lanzilotti, Pearl River, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Feb. 9, 1977, Ser. No. 767,092
Int. Cl.[2] C07D *295/08*
U.S. Cl. 544—373 2 Claims

1. A process for the preparation of cis-5,6-dimethoxy-2-methyl-3-[2-(4-phenyl-1-piperazinyl)ethyl]indoline which comprises ionically hydrogenating 5,6-dimethoxy-2-methyl-3-[2-(4-phenyl-1-piperazinyl)ethyl]indole with a hydrogenation pair consisting essentially of a proton donor selected from the group consisting of concentrated phosphoric acid, concentrated sulfuric acid, trifluoroacetic acid and polyphosphoric acid and a hydride ion donor selected from the group consist-

ing of di(alkyl C_1-C_3)silanes, tri(alkyl C_1-C_3)silanes, diphenylsilane and triphenylsilane at a temperature of from about 25° to about 65° C. for a period of time sufficient for a substantial degree of Δ^2-hydrogenation to occur.

4,089,854

BENZIMIDAZOBENZISOQUINOLINONE UREAS USEFUL AS GREASE THICKENERS

Howard A. Harris, New York, N.Y., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 716,614, Aug. 23, 1976, Pat. No. 4,040,968. This application May 23, 1977, Ser. No. 799,913

Int. Cl.² C07D *471/06*

U.S. Cl. 260—282 **4 Claims**

1. A ketoheterobicyclic compound defined by the formula:

wherein R is an aliphatic hydrocarbyl radical of 16 to 22 carbon atoms.

4,089,855

PROCESS FOR THE STEREOSELECTIVE REDUCTION OF 6- AND 8-KETO MORPHINE AND MORPHINAN DERIVATIVES WITH FORMAMIDINESULFINIC ACID AND COMPOUNDS OBTAINED THEREBY

Nithiananda Chatterjie, Flushing, and Charles E. Inturrisi, New York, both of N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

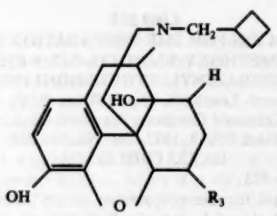
Filed Apr. 23, 1976, Ser. No. 679,677

Int. Cl.² C07D *489/08*; A61K *31/485*

U.S. Cl. 260—285 **18 Claims**

1. Process for the stereoselective reduction of of 6- or 8-keto-6,7-dihydromorphine and 6- or 8-keto morphinan derivatives to form the corresponding 6β-hydroxy or 8β-hydroxy epimers thereof which comprises reducing said 6-keto or 8-keto derivatives with an alkaline solution of formamidinesulfinic acid.

18. A compound of the formula:



wherein:

R_3 represents β-hydroxy, lower alkoxy containing 1 to 6 carbon atoms or lower alkanoyloxy containing 2 to 6 carbon atoms, or a pharmaceutically acceptable acid addition salt thereof.

4,089,856

1-ETHYL-1-(ALKOXYCARBONYLETHYL)-OCTAHYDRO-INDOLO[2,3-a]QUINOLIZINES

Csaba Szántay; Lajos Szabó; György Kalaus; Egon Karpáti, and László Szporny, all of Budapest, Hungary, assignors to Richter Gedeon Vegyészeti Gyár Rt., Budapest, Hungary

Filed Jun. 23, 1976, Ser. No. 699,084

Claims priority, application Hungary, Jun. 27, 1975, RI 570

Int. Cl.² C07D *459/00*

U.S. Cl. 260—293.53 **5 Claims**

1. 1α-Ethyl-1-(sec-butoxycarbonyl-ethyl)-1,2,3,4,6,7,12,12bα-octahydro-indolo[2,3-a]quinolizine.

4,089,857

TETRATHIAPENTALENE AND TETRASELENAPENTALENE COMPOUNDS

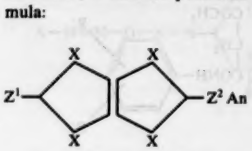
Edward Martin Engler, Wappingers Falls, N.Y., and Robert Rhees Schumaker, Los Gatos, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1976, Ser. No. 755,891

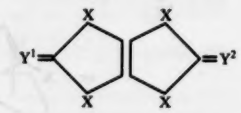
Int. Cl.² C07D *517/04*

U.S. Cl. 260—293.56 **6 Claims**

1. 1, 3, 4, 6-tetrathia-2, 5-diheteropentalene and 1, 3, 4, 6-tetraselena-2, 5-dihetero-pentalene compounds having the formula:



or



wherein X is S or Se; each of Y^1 and Y^2 is O, S, or Se; each of Z^1 and Z^2 is —SR, SeR or

wherein R and R^1 are H, lower alkyl, phenyl, or taken together with the N form a piperidine or pyrrolidine ring, and An is the anion of a strong acid.

4,089,858

HETEROCYCLIC-AMINO-ACRYLIC ACID DERIVATIVES

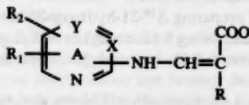
Zoltán Mészáros; József Knoll; István Hermecz; Piroska Simon; Peter Szentmiklosy; Lelle Vasvári; Agnes Horvath; Gabor Horvath, all of Budapest, and Peter Dvortsák, Ocsa, all of Hungary, assignors to Chinoin Gyógyszer és Vegyészeti Termekék Gyára Rt., Budapest, Hungary

Continuation of Ser. No. 330,125, Feb. 6, 1973, abandoned. This application Sep. 17, 1975, Ser. No. 614,208

Int. Cl.² C07D *213/02*

U.S. Cl. 260—295 R **2 Claims**

1. A compound of the formula



and tautomeric forms thereof or a hydrochloric acid, sulfuric

acid, phosphoric acid, perchloric acid, citric acid, amygdalic acid or malic acid salt thereof,

R being selected from the group which consists of methyl, ethyl, phenyl, benzyl, $CH_2COOC_2H_5$, $-(CH_2)_2$-$COOC_2H_5$, and $-(CH_2)_3COOC_2H_5$;

R_1 and R_2 each being hydrogen or together forming a —CH=CH—CH=CH— group attached at the 2 and 3 or the 3 and 4 positions to the ring A;

X and Y being —CH= or —N= with at least one of X and Y being —CH=;

R_3 being H or CH_3; and

ring A being unsubstituted or substituted with a substituent selected from the group consisting of methyl, ethyl, propyl, nitro chloro, bromo, hydroxyl, methoxy, ethoxy, carboxy ethoxycarbonyl, carboxamido, amino, methylamino, dimethylamino and acetylamino.

4,089,859

BISQUINOXALINES

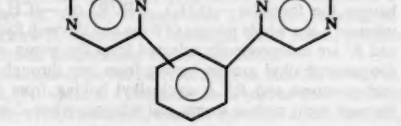
James M. Watson, Big Spring, Tex., assignor to Cosden Technology, Inc., Big Spring, Tex.

Filed Apr. 30, 1973, Ser. No. 355,763

Int. Cl.² C07D *487/04*

U.S. Cl. 544—353 **4 Claims**

1. A compound having the structural formula



wherein R is selected from the group consisting of a carboxylic acid radical of from 1 to 6 carbon atoms and —OH.

4,089,860

PREPARATION OF HYDANTOINS BY REACTING ESTERS OF ETHYLENE-1,2-DICARBOXYLIC ACIDS AND UREAS AND THIOUREAS

Rudolf Merten, and Ludwig Rottmaier, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Germany

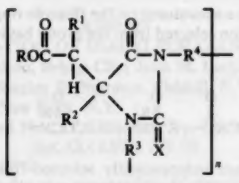
Filed Aug. 31, 1976, Ser. No. 719,248

Claims priority, application Germany, Sep. 6, 1975, 2539730

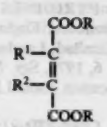
Int. Cl.² C07D *233/78, 233/80*

U.S. Cl. 544—295 **6 Claims**

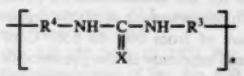
1. A process for preparing a compound of the formula



wherein R is alkyl having one to eighteen carbon atoms; R^1 and R^2 are hydrogen or alkyl having 1 to 18 carbon atoms; R^3 is monofunctional or polyfunctional and is selected from the group consisting of hydrogen; alkyl and cycloalkyl each having up to 18 carbon atoms; said alkyl and cycloalkyl substituted with halogen or hydroxy; aryl and aralkyl each having up to 16 carbon atoms; said aryl substituted with nitro, halogen, lower alkyl, lower alkoxy, or hydroxy; furan; pyridine; thiophene; imidazole; pyrimidine and piperazine; R^4 is monofunctional or polyfunctional and is selected from the group consisting of hydrogen; alkyl and cycloalkyl each having up to eighteen carbon atoms; said alkyl and said cycloalkyl substituted by halogen or hydroxy; aryl and aralkyl each having up to 16 carbon atoms; said aryl substituted with nitro, halogen, lower alkyl, lower alkoxy or hydroxy; furan; pyridine; thiophene; imidazole; pyrimidine and piperazine; X is O or S and n is from 1 to 30, said process comprising reacting a compound of the formula



with a compound of the formula



at a temperature of from 80° to 250° C in a single-stage reaction.

4,089,861

(+)-(S)-ENANTIOMER OF 3-{2-[4-(8-FLUORO-10,11-DIHYDRO-2-METHYL-DIBENZO[b,f]THIEPIN-10-YL)-1-PIPERAZINYL]-ETHYL}-2-OXAZOLIDINONE

Emilio Kyburz, Reinach, Switzerland, assignor to Hoffmann-La Roche, Inc., Nutley, N.J.

Filed May 26, 1976, Ser. No. 690,325

Claims priority, application Switzerland, Jun. 6, 1975, 7353/75; Mar. 19, 1976, 3506/76

Int. Cl.² C07D *413/14*

U.S. Cl. 544—369 **2 Claims**

1. The (+)-(S)-enantiomer of 3-{2-[4-(8-fluoro-10,11-dihydro-2-methyl-dibenzo-[b,f]thiepin-10-yl)-1-piperazinyl]-ethyl}-2-oxazolidinone or a pharmaceutically acceptable acid addition salt thereof, essentially free of its (−)-(R)-enantiomer.

4,089,862

PYRIDYL SUBSTITUTED ERGOLINE DERIVATIVES

Luigi Bernardi; Carlo Elli; Giovanni Falconi, and Rosella Ferrari, all of Milan, Italy, assignors to Societa' Farmaceutici Italia S.p.A., Milan, Italy

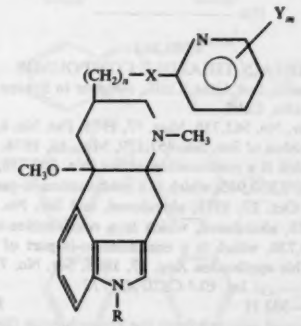
Filed Jan. 4, 1977, Ser. No. 756,725

Claims priority, application United Kingdom, Jan. 9, 1976, 00738/76

Int. Cl.² C07D *457/02*

U.S. Cl. 260—285.5 **10 Claims**

1. A compound of the formula I:



where R is hydrogen or methyl, X is sulphur or the NH group, Y is selected from the class consisting of methyl, methoxy, chlorine, bromine, iodine, nitro or cyano, *m* is 0, 1 or 2, and *n* is 1 or 2,
and their pharmaceutically acceptable salts.

4,089,863

PROCESS FOR PRODUCING PYRIDINE AND METHYL PYRIDINES

John Irvine Darragh, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Aug. 6, 1976, Ser. No. 712,377

Claims priority, application United Kingdom, Aug. 22, 1975, 34971/75

Int. Cl.² C07D *213/10*

U.S. Cl. 260—290 P **8 Claims**

1. A process for the manufacture of pyridine and methyl pyridines which comprises the catalytic vapour-phase reaction at a temperature of from 300° to 550° C of formaldehyde, acetaldehyde and ammonia in the presence of not more than 0.05 moles of molecular oxygen for each mole of total aldehyde reactants and in the presence of a silica-alumina catalyst and at least 3 moles of steam for each mole of total aldehyde reactants, wherein the molar ratio of ammonia to total aldehyde reactants is at least 0.5 moles of ammonia per mole of total aldehyde reactants and the reaction mixture contains at least 0.2 moles of formaldehyde per mole of acetaldehyde.

4,089,864

4-(10,11-DIHYDRO-CIS AND TRANS-10,11-DIHYDROXY-5H-DIBENZO[a,d]CYCLOHEPTEN-5-YLIDENE)-PIPERIDINES

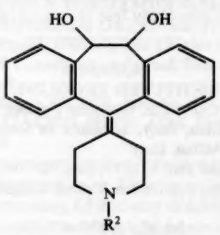
John D. Prugh, Chalfont, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Mar. 25, 1974, Ser. No. 454,195

Int. Cl.² C07D *211/22*

U.S. Cl. 260—293.62 **5 Claims**

1. The compound of structural formula:



wherein R_2 is hydrogen, or lower alkyl, having from 1 to 6 carbon atoms.

4,089,865

CERTAIN THIAZOLE COMPOUNDS

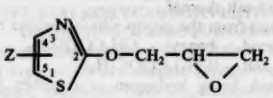
John A. Edwards, Los Altos, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 562,718, Mar. 27, 1975, Pat. No. 4,001,421, which is a division of Ser. No. 451,179, Mar. 14, 1974, Pat. No. 3,897,441, which is a continuation of Ser. No. 289,730, Sep. 15, 1972, Pat. No. 3,850,945, which is a continuation-in-part of Ser. No. 193,172, Oct. 27, 1971, abandoned, and Ser. No. 343,945, Mar. 22, 1973, abandoned, which is a continuation-in-part of Ser. No. 289,730, which is a continuation-in-part of Ser. No. 193,172. This application Aug. 27, 1976, Ser. No. 718,441

Int. Cl.² C07D *417/12*

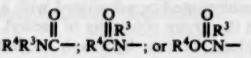
U.S. Cl. 260—302 H **17 Claims**

1. A compound selected from the group having the formula



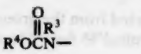
(II)

wherein Z is a substituent on the thiazole ring at either the 4- or 5-position selected from the group having the formulas:



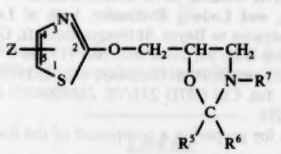
wherein

R^3 and R^4 are independently selected from the group of hydrogen; alkyl having from one through 12 carbon atoms; cycloalkyl having from three through 12 carbon atoms; phenyl; lower phenylalkyl wherein said alkyl has from one through six carbon atoms, or substituted phenyl or substituted lower phenylalkyl wherein said phenyl has one or two substituents independently selected from the group of hydroxy, lower alkyl, lower alkoxy, or halo; terminally substituted alkyl group having from two through 12 carbon atoms having one substituted terminal carbon atom having a substituent selected from the group consisting of hydroxy, acyloxy selected from the group of akanoyloxy having from two through 12 carbon atoms, benzoyloxy, phenylacetyloxy, phenylpropionyloxy, β-cyclopentylpropionyloxy, and toluoyloxy and alkoxy having from one through six carbon atoms; and groups having the formulas $-(CH_2)_{n+1}NR^8R^9$ or $-(CH_2)_nR^{10}$ wherein *n* is a whole integer of from one through four, R^8 and R^9 are independently selected from the group of hydrogen and alkyl groups having from one through four carbon atoms and R^{10} is cycloalkyl having from three through eight carbon atoms; and wherein when Z is



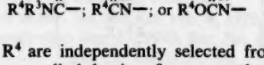
then R^4 cannot be hydrogen.

12. A compound selected from the group having the formula



(III)

wherein Z is a substituent on the thiazole ring at either the 4- or 5-position selected from the group having the formulas:



wherein

R^3 and R^4 are independently selected from the group of hydrogen; alkyl having from one through 12 carbon atoms; cycloalkyl having from three through 12 carbon atoms; phenyl; lower phenylalkyl wherein said alkyl has from one through six carbon atoms, or substituted phenyl or substituted lower phenylalkyl wherein said phenyl has one or two substituents independently selected from the group of hydroxy, lower alkyl, lower alkoxy, or halo; terminally substituted alkyl group having from two through 12 carbon atoms having one substituted terminal carbon atom having a substituent selected from the group consisting of hydroxy, acyloxy selected from the group of

alkanoyloxy having from two through 12 carbon atoms, benzoyloxy, phenylacetyloxy, phenylpropionyloxy, β-cyclopentylpropionyloxy, and toluoyloxy and alkoxy having from one through six carbon atoms; and groups having the formulas $-(CH_2)_{n+1}NR^8R^9$ or $-(CH_2)_nR^{10}$ wherein n is a whole integer of from one through four, R^8 and R^9 are independently selected from the group of hydrogen and alkyl groups having from one through four carbon atoms and R^{10} is cycloalkyl having from three through eight carbon atoms; and wherein when Z is

then R^4 cannot be hydrogen; R^5 and R^6 are independently selected from the group of hydrogen, lower alkyl, phenyl, lower phenylalkyl wherein said alkyl has from one through six carbon atoms, or together with the carbon atom to which they are joined form a cycloalkyl having from five through seven carbon atoms;

R^7 is hydrogen, lower alkyl, phenyl; lower phenylalkyl wherein said alkyl has from one through six carbon atoms, or substituted phenyl or substituted lower phenylalkyl wherein said phenyl has one or two substituents independently selected from the group of hydroxy, lower akyl, lower alkoxy, or halo;

and pharmaceutically acceptable salts thereof.

4,089,866

CERTAIN BENZOTHIAZOLIUM COMPOUNDS

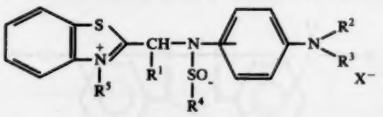
Stanley M. Bloom, Waban; Alan L. Borror, Lexington, and Richard B. Greenwald, Cambridge, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 590,144, Jun. 25, 1975, Pat. No. 4,006,151, which is a continuation-in-part of Ser. No. 399,456, Sep. 21, 1973, abandoned, which is a division of Ser. No. 261,270, Jun. 9, 1972, Pat. No. 3,794,485. This application Nov. 12, 1976, Ser. No. 741,240

Int. Cl.[2] C07D *277/64*

U.S. Cl. 260—304 C **8 Claims**

1. A compound represented by the formula:



wherein R^1 is hydrogen or 1 to 4 carbon alkyl; R^2, R^3 and R^5 is 1 to 4 carbon alkyl; R^4 is 1 to 4 carbon alkyl, phenyl or (C_1–C_{12} alkyl) phenyl; and X is an acid anion.

4,089,867

PREPARATION OF DIACYLFURAZAN OXIDES

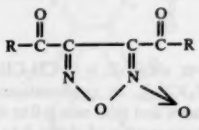
Roger G. Duranleau, Bridge City; John M. Larkin, Austin, both of Tex., and Stanley R. Newman, Fishkill, N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Nov. 11, 1976, Ser. No. 740,997

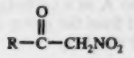
Int. Cl.[2] C07D *271/08*

U.S. Cl. 260—307 G **16 Claims**

1. A method for the preparation of diacylfurazan oxides corresponding to the formula:



where R is an alkyl group having 1 to 20 carbon atoms or an aryl group of 6 to 20 carbon atoms which comprises contacting an alpha-nitroketone or a mixture of alpha-nitroketones of the formula:



where R is as defined above with catalytic amounts of an organic acid having 2 to 18 carbon atoms and a pk_a of about 4.0 to about 0.5 in the substantial absence of added water and in the presence of a non-reactive, non-polar solvent at a temperature of from about 50° to 150° C.

4,089,868

SULFONIUM SALT SUBSTANTIVE SUNSCREEN MATERIALS

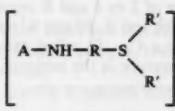
John Fred Gerecht, Somerville, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 148,158, May 28, 1971, Pat. No. 3,864,474, which is a continuation-in-part of Ser. No. 820,280, Apr. 29, 1969, abandoned, which is a continuation-in-part of Ser. No. 492,316, Oct. 1, 1965, abandoned. This application Jan. 6, 1975, Ser. No. 538,690

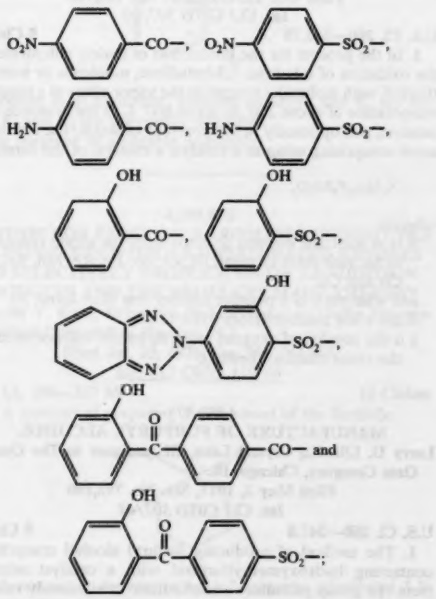
Int. Cl.[2] C07D *249/20*

U.S. Cl. 260—308 B **16 Claims**

1. A substantive sulfonium salt sunscreen agent represented by the formula:



wherein A is a substituted benzene sunscreening moiety having a prominent spectral absorption peak within the range of 250–400 millimicrons and selected from the group consisting of



R represents alkylene of from 2 to 18 carbon atoms; R′ represents alkyl of from 7 to 26 carbon atoms; R″ represents alkyl of from 1 to 4 carbon atoms; the sum of the carbon atoms in R′ and R″ is not less than 9 and not greater than 27, and wherein the nitrogen is linked to A as a carboxamido or sulfonamido group, and X is selected from the group consisting of Br, Cl, I, $C_2H_5SO_4$, CH_3CO_2 and CH_3SO_4.

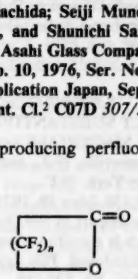
4,089,869

PROCESS FOR PRODUCING PERFLUOROLACTONE

Masaaki Yamabe, Machida; Seiji Munekata; Seisaku Kumai, both of Yokohama, and Shunichi Samejima, Tokyo, all of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed Sep. 10, 1976, Ser. No. 722,076
Claims priority, application Japan, Sep. 23, 1975, 50-114333
Int. Cl.[2] C07D *307/32*
U.S. Cl. 260—343.5 **9 Claims**

1. A process for producing perfluorolactone having the formula



wherein *n* is an integer of 2 to 4, which comprises reacting a fluoro compound having the formula

$$I(CF_2)_nCOX$$

wherein *n* is an integer of 2 to 4 and X represents a halogen atom, —OR or $—NR^1R^2$, and R, R^1 and R^2 respectively represent hydrogen atom or a C_1 – C_{10} alkyl group, with fuming sulfuric acid at a temperature in the range of 30° to 150° C.

4,089,870

PREPARATION OF MALEIC ANHYDRIDE FROM FOUR-CARBON HYDROCARBONS

Noel J. Bremer, Kent; James F. White, Akron, and Ernest C. Milberger, Solon, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Oct. 21, 1976, Ser. No. 734,705
Int. Cl.[2] C07D *307/60*
U.S. Cl. 260—346.75 **9 Claims**

1. In the process for the production of maleic anhydride by the oxidation of n-butane, 1,3-butadiene, n-butenes or mixture thereof, with molecular oxygen in the vapor phase at a reaction temperature of about 250° to about 600° C in the presence of a catalyst, and optionally in the presence of steam, the improvement comprising using as a catalyst a catalyst of the formula

$$X_aMo_{12}P_bRb_cO_x$$

wherein

X is at least one element selected from the group consisting of Sn, rare earth element, Ni, Zr, Ba, Fe, Rh, Mn, Re, Ru, Co and Cu;

and wherein *a* is a positive number less than about 20;

b and *c* are numbers from 0.001 to 10;

x is the number of oxygens required by the valence states of the other elements present.

4,089,871

MANUFACTURE OF FURFURYL ALCOHOL

Larry D. Lillwitz, Crystal Lake, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Filed May 2, 1977, Ser. No. 792,890
Int. Cl.[2] C07D *307/44*
U.S. Cl. 260—347.8 **8 Claims**

1. The method of producing furfuryl alcohol comprising: contacting hydroxymethylfurfural with a catalyst selected from the group palladium and rhodium; continuously removing furfuryl alcohol from the contacting mixture by distillation therefrom; said contacting taking place at a temperature above 135° C., said hydroxymethylfurfural having a pH between 6.5 and 9 inclusive.

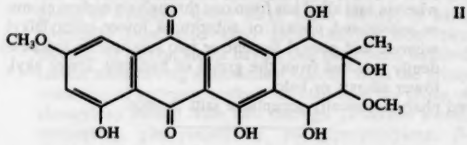
4,089,872

ANTIBIOTICS STEFFIMYCINOL AND 7-DEOXYSTEFFIMYCINOL AND PROCESS FOR PREPARING THE SAME

James M. Koert, and Paul F. Wiley, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Mar. 9, 1977, Ser. No. 775,856
Int. Cl.[2] C07C *49/72*
U.S. Cl. 260—365 **10 Claims**

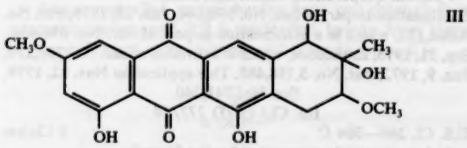
1. Steffimycinol, a compound having the following structure:



II

and alkali and alkaline earth metal salts thereof.

2. 7-Deoxysteffimycinol, a compound having the following structure:



III

and alkali and alkaline earth metal salts thereof.

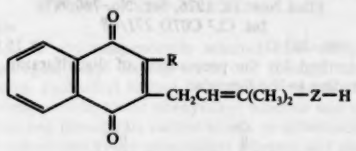
4,089,873

PREPARATION OF MENAQUINONES

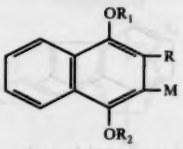
Henry Rapoport, Berkeley, and Clinton D. Snyder, Monte Sereno, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Continuation-in-part of Ser. No. 540,450, Jan. 13, 1975, abandoned. This application Apr. 7, 1975, Ser. No. 565,473
Int. Cl.[2] C07C *41/00, 43/25, 45/00, 49/73*
U.S. Cl. 260—396 K **22 Claims**

1. A method of preparing menaquinones of the formula



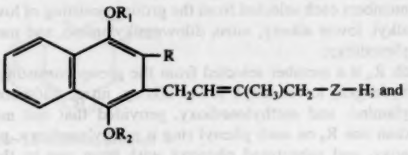
wherein R is lower alkyl, Z is $—CH_2CH=C(CH_3)CH_2]_m$, $—CH_2CH_2CH(CH_3)CH_2]_n$, or combinations thereof, and in which each of *m* and *n*, and their sum is 0 to about 12, comprising reacting at a temperature of about 5 to 60° C. 3-metallo naphthalene of the formula



wherein R_1 and R_2 are lower alkyl, or monocyclic, hydrocarbyl aralkyl of 7 to about 12 carbon atoms, and M is selected from the group consisting of Li, $(CuLi)_{1/2}$, MgBr and Cu, with prenyl halide of the formula

$$X-CH_2CH=C(CH_3)CH_2-Z-H$$

wherein X is halogen, to provide 1,4-diether naphthalene of the formula



oxidizing the 1,4-diether naphthalene to produce the corresponding menaquinone.

4,089,874

1,3,4-THIADIAZOL-2,5-DIYL-BIS-BENZOIC ACID ESTERS

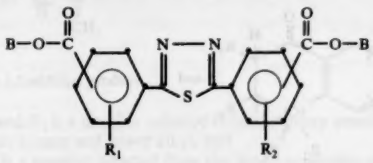
Gether Irick, Jr., and Charles A. Kelly, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 657,510, Feb. 12, 1976, Pat. No. 4,069,227, which is a division of Ser. No. 484,843, Jul. 1, 1974, Pat. No. 3,963,738. This application Sep. 29, 1977, Ser. No. 837,777

Int. Cl.[2] C07D *285/12*

U.S. Cl. 260—302 D **4 Claims**

1. A composition of matter having the formula

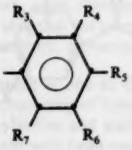


wherein

R_1 and R_2 are hydrogen, chloro, or bromo; and

is attached to the benzenoid ring in either the meta or para position from the carbon atom connected to the heterocyclic ring; and

B is a group having the formula



wherein

at least one R_3 is hydrogen and the other R_3, R_4, R_5, R_6 and R_7 of each B group are hydrogen, or at the most three substituents selected from lower alkyl, hydroxy, cyano, chloro and bromo.

4,089,875

PROCESS AND INTERMEDIATES FOR ISOINDOLE DERIVATIVES

Roland Jaunin, Basel, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

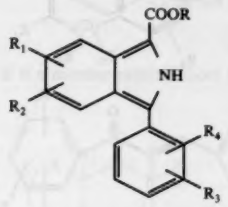
Filed Jul. 7, 1977, Ser. No. 813,590

Claims priority, application Austria, Aug. 2, 1976, 5704/76

Int. Cl.[2] C07C *119/14*; C07D *209/44*

U.S. Cl. 260—326.1 **9 Claims**

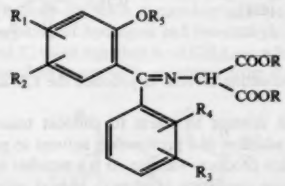
1. A process for the preparation of isoindoles of the formula



I

wherein R is lower alkyl and R_1, R_2, R_3 and R_4, independently, are hydrogen, halogen, lower alkyl, lower alkoxy or trifluoromethyl,

which comprises heating a malonic acid ester of the formula



II

wherein R_5 is hydrogen, alkanoyl or aroyl, and R, R_1, R_2, R_3 and R_4 are previously described,

in the presence of a suitable imidazole.

4,089,876

METHOD FOR REACTING 2-AROMATIC SUBSTITUTED 1,3-DITHIANES WITH α,β-UNSATURATED KETONES TO SELECTIVELY PRODUCE 1,4- OR 1,2-ADDITION PRODUCTS AND THE PRODUCTS MADE THEREBY

Vinayak V. Kane, Princeton, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

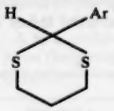
Filed Jul. 23, 1976, Ser. No. 707,965

Int. Cl.[2] C07D *339/08*

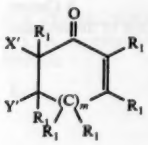
U.S. Cl. 260—327 M **14 Claims**

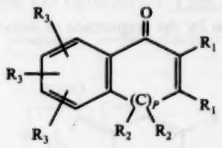
1. A method of preparing a compound of the formula:

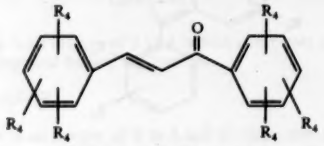
which comprises deprotonating a 2-aromatic substituted 1,3-dithiane of the formula:

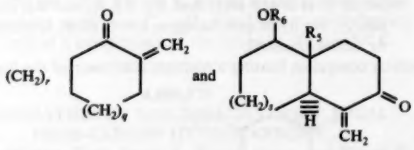


at a temperature between −75° C and −100° C, in the presence of a base in an aprotic anhydrous solvent, reacting the 2-carbanion formed with an α,β-unsaturated ketone selected from the group consisting of:









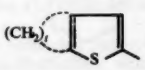
and then either

a. adding a protonating solvent to produce the 1,2- addition product; or

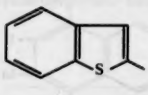
b. allowing the mixture to warm to ambient temerature, followed by addition of a protonating solvent to produce the 1,4-addition product; wherein Ar is a member selected from the group consisting of phenyl, phenyl substituted with from one to three members each selected from the group consisting of lower alkyl, lower alkoxy, nitro, diloweralkylamino, and methylenedioxy, provided that not more than one of said members is methylenedioxy, phenoxy, and substituted phenoxy,

wherein the substituent is one to three members selected from the group consisting of lower alkyl, lower alkoxy, nitro, diloweralkylamino and methylenedioxy; naphthyl; naphthyl substituted with from one to three members each selected from the group consisting of lower alkyl, lower alkoxy, nitro, diloweralkylamino, methylenedioxy, phenoxy and substituted phenoxy,

wherein the substituent is one to three members selected from the group consisting of lower alkyl, lower alkoxy, nitro, diloweralkylamino and methylenedioxy, provided that no more than one of said members is methylenedioxy; 2-thienyl; 2-thienyl substituted with from one to three lower alkyls;



wherein *t* is an integer from 3 to 5; and



and

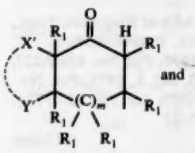
each R_1 is a member selected from the group consisting of hydrogen and lower alkyl; X′ and Y′ taken separately are each a member selected from the group consisting of hydrogen and lower alkyl; X′ and Y′ taken together is $-(CH_2)n-$, where *n* is an integer from 2 to 6; *m* is an integer from 0 to 7; each R_2 is lower alkyl;

p is an integer from 0 to 3; each R_3 is a member selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, nitro, diloweralkylamino, and methylenedioxy, provided that not more than one R_3 is methylenedioxy, phenoxy, and substituted phenoxy with from one to three members each selected from the group consisting of lower alkyl, lower alkoxy, nitro, diloweralkylamino, and methylenedioxy;

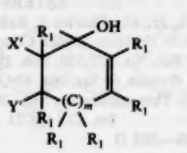
each R_4 is a member selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, nitro, diloweralkylamino, and methylenedioxy, provided that not more than one R_4 on each phenyl ring is methylenedioxy, phenoxy, and substituted phenoxy with from one to three members each selected from the group consisting of lower alkyl, lower alkoxy, nitro, diloweralkylamino and methylenedioxy;

q is an integer from 0 to 2 and *r* is an integer from 3 to 6; and

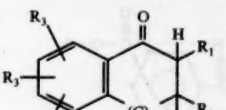
B is a member selected from the group consisting of:



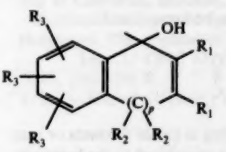
in the 1,4-addition product



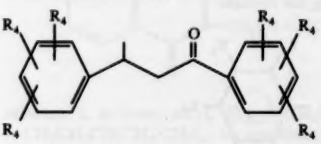
in the 1,2-addition product



in the 1,4-addition product

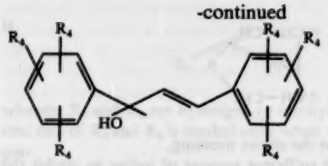


in the 1,2-addition product

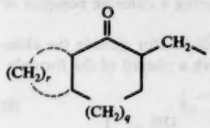


in the 1,4-addition product

-continued

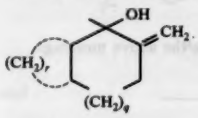


in the 1,2-addition product

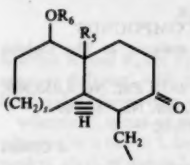


and

in the 1,4-addition product

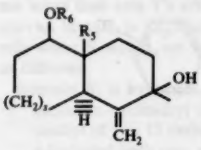


in the 1,2-addition product



and

in the 1,4-addition product



in the 1,2-addition product

and R_5 is a member selected from the group consisting of hydrogen and lower alkyl; and

R_6 is a member selected from the group consisting of lower alkyl and aryl.

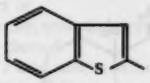
9. A compound of formula:

wherein, Ar is a member selected from the group consisting of phenyl, phenyl substituted with from one to three members each selected from the group consisting of lower alkyl, lower alkoxy, nitro, diloweralkylamino, and methylenedioxy, provided that not more than one of said members is methylenedioxy, phenoxy, and substituted phenoxy,

wherein the substituent is one to three members selected from the group consisting of lower alkyl, lower alkoxy, nitro, diloweralkylamino and methylenedioxy; naphthyl; naphthyl substituted with from one to three members each selected from the group consisting of lower alkyl, lower alkoxy, nitro, diloweralkylamino, methylenedioxy, phenoxy, and substituted phenoxy,

wherein the substituent is one to three members selected from the group consisting of lower alkyl, lower alkoxy, nitro, diloweralkylamino and methylenedioxy, provided that no more than one of said members is methylenedioxy; 2-thienyl; 2-thienyl substituted with from one to three lower alkyls;

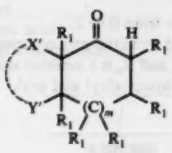
wherein t is an integer from 3 to 5; and



and

wherein B is a member selected from the group consisting of:

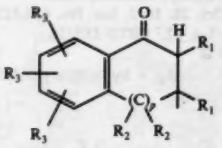
a)



wherein; each R_1 is a member selected from the group consisting of hydrogen and lower alkyl; X′ and Y′ taken separately are each a member selected from the group consisting of hydrogen and loweralkyl;

X′ and Y′ taken together is $—(CH_2)_n—$, where n is an integer from 2 to 6; and m is an integer from 0 to 7;

b)

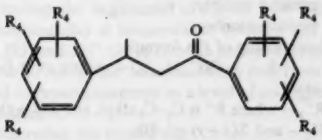


wherein; each R_1 is a member selected from the group consisting of hydrogen and lower alkyl; each R_2 is lower alkyl;

p is an integer from 0 to 3; and each R_3 is a member selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, nitro, diloweralkylamino, and methylenedioxy; provided that not more than one R_3 is methylenedioxy, phenoxy, and substituted phenoxy,

wherein the substituent is one to three members selected from the group consisting of lower alkyl, lower alkoxy, nitro, diloweralkylamino and methylenedioxy;

c)

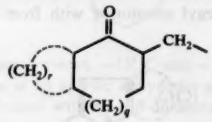


wherein each R_4 is a member selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, nitro, diloweralkylamino, and methylenedioxy, provided that

not more than one R_4 on each phenyl ring is methylenedioxy, phenoxy and substituted phenoxy,

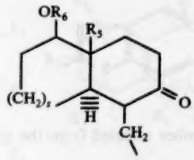
wherein the substituent is one to three members selected from the group consisting of lower alkyl, lower alkoxy, nitro, diloweralkylamino and methylenedioxy;

d)



wherein, q is an integer from 0 to 2 and r is an integer from 3 to 6; and

e)



wherein s in an integer from 0 to 2;

R_5 is a member selected from the group consisting of hydrogen and lower alkyl; and R_6 is a member selected from the group consisting of lower alkyl and aryl.

4,089,877

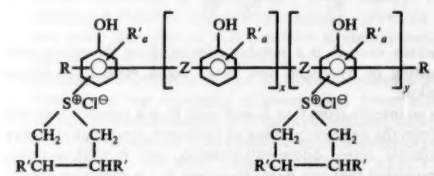
PROCESS FOR PRODUCING HYDROXYARYLPOLYMETHYLENESULFONIUM SALTS

Thomas C. Klingler; Donald L. Schmidt; Warner Jensen, Jr., and Demetrius Urchick, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 28, 1975, Ser. No. 626,417
Int. Cl.[2] C07D *333/16*
U.S. Cl. 260—332.3 R **16 Claims**

1. A process for making a hydroxyarylpolymethylenesulfonium salt of the formula

I



wherein:

each R individually is H, OH or C_1–C_4 alkoxy;

each R′ individually is H or C_1–C_4 alkyl, and a is 1 or 2;

each sulfur is ortho or para to a phenolic oxygen;

x is 0 or a positive number;

y is 0 or a positive number;

Z is a bridging group of the formula:

(1) —O—, —S—, —O(C_mH_{2m})O— where m is 1-6, and $\Sigma(x+y)=1$;

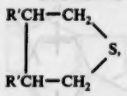
(2) —CR''_2— where R″ is C_1–C_4 alkyl, and $\Sigma(x+y)=1$; or

(3) —CH_2— and $\Sigma(x+y)=1$-20;

said process comprising the steps of:

(a) reacting by contacting chlorine or sulfuryl chloride with a solution comprising (1) a cyclic polymethylene sulfide of the formula

II

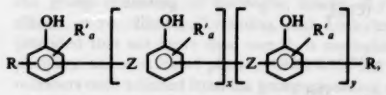


wherein R′ has the above meaning,

(2) a small but sufficient amount of iodine to inhibit the formation of cyclic sulfoxides, and (3) HCl dissolved in (4) liquid sulfur dioxide, thus forming a chlorine complex of the cyclic sulfide; and

(b) reacting by contacting in liquid sulfur dioxide the chlorine complex from step (a) with a phenol of the formula

III



where R, R′, a, x, y and Z have the above meanings.

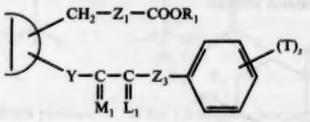
4,089,878

ω-ARYL-9-DEOXY-PGF COMPOUNDS

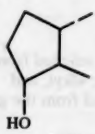
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,243, Sep. 17, 1975, Pat. No. 4,033,989.
This application Apr. 11, 1977, Ser. No. 786,709
Int. Cl.[2] C07C *177/00*
U.S. Cl. 260—408 **8 Claims**

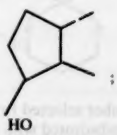
1. A prostaglandin analog of the formula



wherein D is



or



;

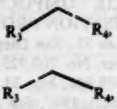
wherein Y is cis—CH=CH—, trans—CH=CH—, or —CH_2CH_2—;

wherein M_1 is

or

wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is



or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the provisio that one of R_3 and R_4 is hydrogen or fluoro only when the other is hydrogen or fluoro;

wherein Z_3 is oxa of methylene;

wherein [m is one to 5, inclusive,] T is chloro, fluoro, trifluoromethyl, alkyl, of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, and s is zero, one, 2, or 3, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl, with the further proviso that [R_7 is] Z_3 is oxa

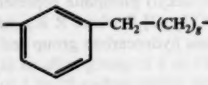
only when R_3 and R_4 are hydrogen or methyl, being the same or different;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation;

wherein Z_1 is

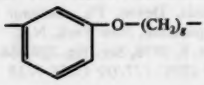
(1) cis—CH=CH—CH_2—$(CH_2)_g$—CF_2—,
(2) cis—CH=CH—CH_2—$(CH_2)_g$—CH_2—,
(3) cis—CH_2—CH=CH—$(CH_2)_g$—CH_2—,
(4) —$(CH_2)_3$—$(CH_2)_g$—CF_2—,
(5) —$(CH_2)_3$—$(CH_2)_g$—CH_2—,
(6) —CH_2—O—CH_2—$(CH_2)_g$—CH_2—,
(7) —$(CH_2)_2$—O—$(CH_2)_g$—CH_2—,
(8) —$(CH_2)_3$—O—$(CH_2)_g$—,

(9)



or

(10)



wherein g is one, 2, or 3.

4,089,879

SURFACE ACTIVE, LIQUID ESTER MIXTURES CONTAINING HYDROXYL, AND A METHOD OF PREPARING SAME

Sasanka Sekhar Naskar; Gustav Renckhoff, both of Witten; Wolfgang Heers, Wetter, and Reinhard Pass, Witten, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Cologne, Germany

Filed Dec. 24, 1975, Ser. No. 644,239

Claims priority, application Germany, Jan. 4, 1975, 2500241; Apr. 19, 1975, 2517354; Aug. 28, 1975, 2538232

Int. Cl.² C11C *3/02*

U.S. Cl. 260—410.7 **38 Claims**

1. Surface active, liquid, hydroxyl-containing mixed ester, having a hydroxyl number from 20 to 260, saponification numbers from 150 to 350 and acid number under 5 which is a condensation product of

(a) 1 mole of glycerine, trimethylolpropane or pentaerythritol or a mixture thereof,

(b) 1 to 2 moles of a saturated, branched, aliphatic monocarboxylic acid of 16 to 26 C atoms or a mixture thereof, and

(c) 0.1 to 0.9 moles, of an aliphatic straight-chain or branched dicarboxylic acid of 3° to 10° C atoms, or an anhydride thereof or a mixture therof.

38. Mixed ester according to claim 1, wherein:

(a) is glycerol

(b) is isostearic acid

(c) is succinic acid anhydride.

4,089,880

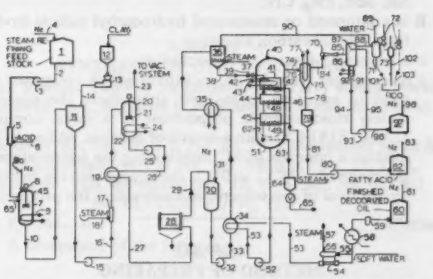
PROCES FOR REFINING FATTY OILS

Frank E. Sullivan, Tiburon, Calif., assignor to Sullivan Systems Inc., Tiburon, Calif.

Continuation-in-part of Ser. No. 558,076, Mar. 13, 1975, abandoned. This application Apr. 19, 1976, Ser. No. 678,404

Int. Cl.² C11B *3/04*

U.S. Cl. 260—424 **26 Claims**



1. A process for refining crude vegetable oils containing phospholipids, trace metals, carotene and free fatty acids, comprising:

(1) degumming the crude oil to remove almost all the phospholipids,

(2) treating the degummed crude oil with weak acid and bleaching clay at temperatures between 200° F. and 260° F. (93° and 127° C.) to remove enough trace metals therefrom to render the oil substantially free from trace metals and to remove carotene to a level of no higher than about 30 ppm,

(3) deaerating the treated oil,

(4) steam-stripping the deaerated oil under vacuum conditions and at a temperature in the range of about 210° C. to 275° C. to remove free fatty acids while also bleaching it and deodorizing it.

4,089,881

COMPLEXES OF METALLATED COORDINATION LIGANDS

Charles M. Lukehart, Nashville, Tenn., assignor to Vanderbilt University, Nashville, Tenn.

Filed Nov. 12, 1976, Ser. No. 741,390
Int. Cl.[2] C07F *13/00*
U.S. Cl. 260—429 R **38 Claims**

1. A compound having the formula:

$$(L_aM[C(X)A][C(Y)B]_bM'$$

wherein

M is a transition metal;

M′ is any metal, except lithium, magnesium or boron, or a proton;

L is a coordinating ligand selected from the group consisting of at least one of CO, PF_3, PCl_3, PR_3, $P(OR)_3$, AsR_3, NCO, CN, NR_3, halogen, R, OR, CNR, NO, C(O)R, in unsaturated form, having from 1 to 20 carbon atoms;

X and Y are each an atom or radical selected from the group consisting of at least one of O, S, NR, Se, PR;

A and B are substituents each consisting of at least one of R, OR, NR_2, SR, SeR, PR_2, CN, CF_3;

R is a saturated hydrocarbyl radical having from 1 to 20 carbon atoms or an unsaturated hydrocarbyl radical having from 2 to 20 carbon atoms;

a is an integer from 1 to 10, inclusive;

b is an integer from 1 to 6, inclusive.

34. A process for the production of

$$(L_aM[C(X)A][C(Y)B])_bM'$$

wherein

M is a transistion metal;

M′ is any metal, except lithium or magnesium, or a proton;

L is a coordinating ligand selected from the group consisting of at least one of CO, PF_3, PCl_3, PR_3, $P(OR)_3$, AsR_3, NCO, CN, NR_3, halogen, R, OR, CNR, NO, C(O)R, in unsaturated form, having from 1 to 20 carbon atoms;

X and Y are each an atom or radical selected from the group consisting of at least one of O, S, NR, Se, PR; A and B are substituents each consisting of at least one of R, OR, NR_2, SR, SeR, PR_2, CN;

R is a saturated or unsaturated hydrocarbyl radical having from 1 to 20 carbon atoms;

a is an integer from 1 to 10, inclusive;

b is an integer from 1 to 6, inclusive; which comprises the steps of admixing in an inert atmosphere the approximately stoichiometric proportions of a metal complex $L_aM[C(X)A][CY]$ with a source of B anion, adding to the mixture a complex of M′, maintaining the temperature in the range of −78° C. to 0° C., then quenching the reaction by removal of the solvent, and extracting the product.

4,089,882

METHOD OF PREPARING FLUOROALKYL-CONTAINING ORGANOSILANES

Minoru Takamizawa; Mitsuo Umemura, and Kazuo Kooya, all of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 560,107, Mar. 19, 1975. This application Jul. 5, 1977, Ser. No. 812,855
Claims priority, application Japan, Mar. 22, 1974, 49-32314
Int. Cl.[2] C07F *7/08*
U.S. Cl. 260—448.2 E **14 Claims**

1. In a method for preparing a fluoroalkylsilane represented by the general formula

$$R'CH_2CH_2SiR_nX_{3-n}$$

where R′ is a perfluoroalkyl group having 1 to 6 carbon atoms, R is an alkyl or aryl group, X is a halogen atom or an alkoxy group and *n* is 0, 1 or 2, by reacting an organohydrogensilane represented by the general formula R_nSiHX_{3-n} where R, X and *n* are the same as defined above with a fluorinated olefin represented by the general formula $R'CH=CH_2$ where R′ is the same as defined above, the improvement which comprises carrying out the reaction in the presence of a binary catalyst composed of a platinum compound selected from the group consisting of chloroplatinic acid, chloroplatinic acid-olefin complexes and chloroplatinic acid modified with alcohols and stannous chloride.

4,089,883

PROCESS FOR THE PRODUCTION OF ORGANIC HYDROXY SILICATE COMPOUNDS AND THEIR CONDENSATION PRODUCTS

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 703,925, Jul. 9, 1976, Pat. No. 4,011,253, and Ser. No. 589,626, Jun. 23, 1975, abandoned. This application Feb. 2, 1977, Ser. No. 765,050
Int. Cl.[2] C07F *7/18, 7/04*
U.S. Cl. 260—448.8 R **5 Claims**

1. The process for the production of organic hydroxy silicate compounds and their condensation products by the following steps:

(a) adding about 100 parts by weight of dry granular alkali metal metasilicate slowly to 50 parts by weight of concentrated sulfuric acid;

(b) agitating said mixture to keep the temperature below 100° C and oxygen evolves from the mixture, thereby

(c) producing a white granular mixture of a silicic acid compound and alkali metal sulfate;

(d) washing said mixture with water, then filtering the mixture to remove the alkali metal sulfate and then air drying at 25° to 75° C, leaving a fine white granular silicic acid compound;

(e) mixing about 50 parts by weight of said silicic acid compound with about 30 to 100 parts by weight of a polyhydroxy alcohol compound;

(f) adding an alkali catalyst in the ratio of 1% to 10% by weight of the silicic acid compound and polyhydroxy alcohol compound;

(g) heating the said mixture to just below the boiling point of the polyhydroxy alcohol while agitating for about 20 to 90 minutes, thereby

(h) producing a brown mixture of an organic hydroxy silicate compound and a poly (organic hydroxy silicate) polymer.

4,089,884

TRIS(TRIORGANOSILYLALKYL) PHOSPHITES AND METHOD FOR PREPARING THEM

Toshio Shinohara; Masatoshi Arai, both of Annaka, and Kenichi Kojima, Shizuoka, all of Japan, assignors to Shin-Etsu Chemical Co. and Kumiai Chemical Industry Co., Ltd., both of Tokyo, Japan

Filed Jul. 12, 1977, Ser. No. 814,939
Claims priority, application Japan, Jul. 15, 1976, 51-83454
Int. Cl.[2] C07F *7/10*
U.S. Cl. 260—448.2 N **9 Claims**

1. A tris(triorganosilylalkyl) phosphite represented by the general formula $[R_3Si(CH_2)_nO]_3P$ where R is a substituted or unsubstituted monovalent hydrocarbon group and *n* is a positive integer.

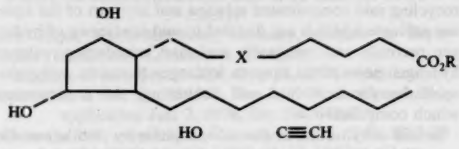
4,089,885

PROSTAGLANDIN DERIVATIVES

George E. M. Husbands, Devon, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Nov. 5, 1976, Ser. No. 739,364
Int. Cl.[2] C07C *177/00*; C07F *7/18*
U.S. Cl. 260—448.8 R **4 Claims**

1. A chemical compound of the structure:



wherein X is a cis double bond, and R is hydrogen, alkyl of from 1 to 6 carbon atoms, an alkali metal cation, or a pharmacologically acceptable cation derived from ammonia or a basic amine.

4,089,886

METHANOL PURIFICATION

Anthony J. Branecky, Kingsville, and David W. Harris, Corpus Christi, both of Tex., assignors to Celanese Corporation, New York, N.Y.

Filed Jul. 21, 1977, Ser. No. 817,751
Int. Cl.[2] C07C *29/24*
U.S. Cl. 260—450 **10 Claims**

1. A process for purifying a crude methanol containing high boiling impurities which have a boiling point higher than that of methanol, such high boiling impurities including water, and also containing iron pentacarbonyl as an impurity, which process consists essentially of the successive steps of:

(a) combining said crude methanol in the liquid state with a source of hypochlorite ions under conditions whereby said hypochlorite ions will oxidize iron in said iron pentacarbonyl to a higher oxidation state; and, then,

(b) passing the crude methanol which has been so combined with said source of hypochlorite ions according to the preceding step (a) to a distillation column operated under such conditions that there is removed as vapors from an upper portion of said column a methanol of improved purity, and such that there is removed a liquid bottoms stream consisting essentially of high boiling impurities including substantially all of the said water and also iron compounds in said higher oxidation state, the iron of said iron compounds having been derived from said iron pentacarbonyl.

5. The process of claim 1 wherein said crude methanol has been produced by the reaction of carbon monoxide with hydrogen, and wherein said high boiling compounds include water and ethanol.

4,089,887

PROCESS FOR THE PRODUCTION OF ISOTHIOCYANATES

Günter Giesselmann, Heusenstamm; Gerd Schreyer, and Rudolf Vanheertum, both of Hanau, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler, Frankfurt, Germany

Filed Jan. 25, 1977, Ser. No. 762,792
Claims priority, application Germany, Jan. 30, 1976, 2603508
Int. Cl.[2] C07C *161/04*; C07D *211/98, 277/38*
U.S. Cl. 260—454 **18 Claims**

1. A process of preparing isothiocyanates of the formula (I)

$$R{-}N{=}C{=}S \qquad (I)$$

where R is (a) an alkyl group of 1 to 18 carbon atoms, (b) an alkyl group of 1 to 18 carbon atoms substituted with at least one —OH, —OR^1 or —SR^1 group where R^1 is alkyl of 1 to 6 carbon atoms or (c) cycloalkyl of 3 to 8 carbon atoms comprising reacting (1) a dithiocarbamate of the formula (II)

$$R{-}NH{-}\overset{\overset{S}{\|}}{C}{-}S{-}Me \qquad (II)$$

where Me is an alkali metal atom, a valence of an alkaline earth metal atom, ammonium or ammonium wherein at least one hydrogen is replaced by R with (2) a cyanogen halide in water, there being employed one mole of the dithiocarbamate of formula (II) as a 5 to 50% aqueous solution also including a base in the presence of an inert, water-immiscible organic solvent at a temperature of about −10° C to about +50° C with at least one mole of the cyanogen halide to form a water phase and an organic solvent phase, the isothiocyanate being in the organic phase.

4,089,888

METHOD FOR PRODUCING A POLYCARBONATE OLIGOMER

Ichiro Tokumitsu; Hideo Konuma; Shigeaki Mochizuki; Kohichi Morotomi; Norio Murai, and Mikio Koyama, all of Tokuyamashi, Japan, assignors to Idemitsu Petrochemical Co. Ltd., Tokyo, Japan

Filed Jul. 12, 1976, Ser. No. 704,209
Int. Cl.[2] C07C *68/02*
U.S. Cl. 260—463 **3 Claims**

1. In the method for producing polycarbonate oligomers having an average molecular weight of 430–460 and a chloroformate radical concentration of 1.1 to 1.2 mol per liter of methylene chloride solution by introducing an aqueous alkaline solution of 2,2-(4,4'-dihydroxy-diphenyl) propane and methylene chloride into a tubular type reactor to form a mixed phase stream which is reacted with phosgene in a parallel flow, the improvement which comprises introducing one to 10 mol % of an inert gas based upon phosgene, together with phosgene into said tubular type reactor.

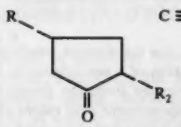
4,089,889

SYNTHESIS OF CYCLOPENTANOL

Frank Kienzle, Therwil, Switzerland, and Perry Rosen, North Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 381,322, Jul. 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 300,633, Nov. 25, 1972, abandoned. This application Sep. 15, 1975, Ser. No. 613,652
Int. Cl.[2] C07C *121/46, 121/66*
U.S. Cl. 260—464 **5 Claims**

1. A compound of the formula



wherein

R is lower alkyl containing from 1 to 7 carbon atoms, or carboxy esterified with either a lower alkyl containing from 1 to 7 carbon atoms or benzyl group; R_2 is —CH_2—C=CR_3 or —CH_2—R'; R' is carboxy esterified either with a lower alkyl containing from 1 to 7 carbon atoms or benzyl group, R_3 is hydrogen or lower alkyl containing from 1 to 7 carbon atoms, and the dotted bond can be optionally hydrogenated

or enantiomers or racemates thereof.

4,089,890

PROCESS FOR THE DIMERIZATION OF ACRYLONITRILE

James Robert Jennings, and Lawrence Francis Michael Kelly, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 684,952, May 10, 1976, Pat. No. 4,059,542. This application Jun. 29, 1977, Ser. No. 811,440

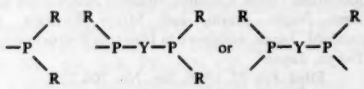
Claims priority, application United Kingdom, May 9, 1975, 19615/75

Int. Cl.[2] C07C *129/00, 121/20*

U.S. Cl. 260—465.8 D **9 Claims**

1. A process for the dimerisation of acrylonitrile, comprising:

contacting acrylonitrile at a temperature in the range of 100° to 300° C with a catalyst composition consisting essentially of a matrix of a refractory metal oxide having chemically bonded to the surface thereof one or more organophosphorus radicals of general formula:



where groups R, which may be the same or different, represent hydrocarbyl groups and Y represents either a divalent hydrocarbyl group or a direct link, the appropriate phosphorus atom or atoms of the radical being bonded to the matrix through the oxygen atom of one or more surface hydroxyl groups of the matrix.

4,089,891

PLEUROMUTILIN SOLVATES

Franz Knauseder, Wörgl, and Helmut Wagner, Kramsach, both of Austria, assignors to Biochemie, Vienna, Austria

Filed Jul. 16, 1976, Ser. No. 706,066

Claims priority, application Switzerland, Jul. 23, 1975, 9623/75

Int. Cl.[2] C07C *69/67*

U.S. Cl. 560—188 **5 Claims**

1. A solvate of pleuromutilin with a halogenated aliphatic hydrocarbon, the mole ratio of pleuromutilin to halogenated aliphatic hydrocarbon in said solvate being about 1 to 1.

4,089,892

PROCESS FOR THE PREPARATION OF PERCARBOXYLIC ACID SOLUTIONS

Willi Hofen, Rodenbach; Gerd Scareyer; Rolf Wirthwein, both of Hanau; Helmut Waldmann, and Gerd Siekmann, both of Leverkusen, all of Germany, assignors to Deutsche Gold-und Silberscheideanstalt Vormals Roessler, Frankfurt am Main and Bayer Aktiengesellschaft, Leverkusen, both of, Germany

Filed Apr. 28, 1976, Ser. No. 678,829

Claims priority, application Germany, Apr. 30, 1975, 2519287

Int. Cl.[2] C07C *179/10;* B01D *3/00*

U.S. Cl. 260—502 R **17 Claims**

1. In a process for the continuous production of a substantially anhydrous solution of a percarboxylic 1–4 carbon atoms in organic solvent selected from the group consisting of carboxylic acid esters, phosphoric acid esters chlorinated hydrocarbons, and aromatic hydrocarbons which comprises contacting aqueous hydrogen peroxide with the corresponding carboxylic acid in the presence of an acid catalyst for the reaction to produce the percarboxylic acid and water, the molar ratio of hydrogen: carboxylic acid during a said contacting being 0.5–30:1, extracting the mixture with the organic solvent for formation of a solvent phase rich in percarboxylic acid and carboxylic acid and containing hydrogen peroxide, and an aqueous raffinate phase rich in hydrogen peroxide and acid catalyst, dehydrating said solvent phase by distillation, distilling at least part of the aqueous raffinate of the solvent extraction under reduced pressure to remove water therefrom and form concentrated solution of hydrogen peroxide and catalyst, recycling said concentrated solution and any part of the aqueous raffinate which is not distilled to said contacting of hydrogen peroxide and carboxylic acid, and introducing make-up hydrogen peroxide as aqueous hydrogen peroxide, and make-up carboxylic acid into said contacting, the improvement which comprises:

in said dehydration of the solvent phase by distillation, distilling off solvent containing water and hydrogen peroxide as overhead product of the distillation, while distilling over an amount of solvent in said over head which is 1.5–40 times the amount required for azeotropic distillation of the water, and withdrawing as bottom product of the distillation said substantially anhydrous solution, condensing said overhead product for formation of two phases, including an aqueous phase containing hydrogen peroxide, and recycling said aqueous phase for use in said contacting, the amount of solvent distilled off in the overhead product being such that the hydrogen peroxide contained in the solvent phase produced in said extraction, is contained in the aqueous phase containing hydrogen peroxide produced in said condensation.

4,089,893

2,2,2-TRIS(HYDROXYMETHYL)ETHYLPHOSPONIC ACID AND METHOD FOR ITS PREPARATION

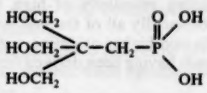
Lawrence J. Carr, Elk Grove Village, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 13, 1976, Ser. No. 750,101

Int. Cl.[2] C07F *9/38*

U.S. Cl. 260—502.4 R **1 Claim**

1.



4,089,894

SULFONATED ALKYLPHENOXY 2 TO 5-CARBON-ATOM ALKANOIC ACIDS AND SALTS

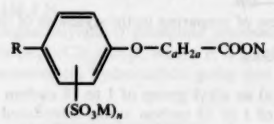
John George Papalos, Ledgewood, N.J., assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Feb. 2, 1976, Ser. No. 654,069

Int. Cl.[2] C07C *143/52;* D06P *5/04*

U.S. Cl. 260—507 R **5 Claims**

1. A compound having the formula



wherein:

R is an alkyl group having 8–20 carbon atoms;

M and N are independently selected from the group consisting of hydrogen, sodium, potassium, ammonium, ethyl ammonium, dimethyl ammonium, and diethanol ammonium;

n is a number of from 1 to 2; and

a is a number of from 1 to 4.

4,089,895

1-AMINO-4-METHOXYBENZENE-2,5-DISULFONIC ACID

Horst Jäger, Koeln-Buchheim, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 299,659, Oct. 24, 1972, which is a continuation of Ser. No. 881,925, Dec. 3, 1969, abandoned. This application Jan. 7, 1976, Ser. No. 647,076

Claims priority, application Germany, Dec. 7, 1968, 1813438

Int. Cl.[2] C07C *143/64;* C09B *29/22;* D06P *1/02*

U.S. Cl. 260—509 1 Claim

1. 1-amino-4-methoxybenzene-2,5-disulphonic acid.

4,089,896

8,12-DIISOPROSTANOIC ACID DERIVATIVES

Carmelo Gandolfi; Gianfederico Doria, both of Milan, and Pietro Gaio, Belluno, all of Italy, assignors to Carlo Erba S.p.A., Milan, Italy

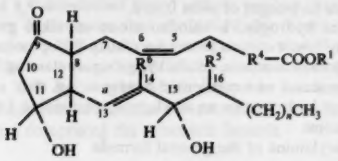
Filed Dec. 15, 1972, Ser. No. 315,460

Claims priority, application Italy, Dec. 17, 1971, 32520 A/71

Int. Cl.[2] C07C *177/00;* A61K *31/19, 31/215*

U.S. Cl. 260—514 D 13 Claims

1. Compounds of general formula (I):



(I)

wherein R^1 is a hydrogen atom, a cation of a pharmaceutically acceptable base or a C_{1-12} alkyl group; R^4 is $—CH_2CH_2—$; n is 3 or 4; each of R^5 and R^6, which may be the same or different, is a hydrogen atom or a C_{1-4} alkyl group; and double bond a is a trans-double bond.

4,089,897

GEMINAL PROSTAGLANDIN ANALOGS

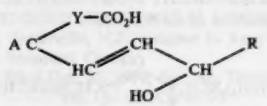
Todd R. Williams, Lake Elmo, and Larry M. Sirvio, Cottage Grove, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 10, 1976, Ser. No. 684,763

Int. Cl.[2] C07C *177/00, 61/38*

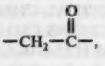
U.S. Cl. 260—514 D 9 Claims

1. A geminal prostaglandin represented by the formula

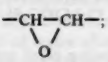


where

A is a 4 or 5 carbon atom ring-completing group $(CH_2)_{1+m}—X—(CH_2)_z$ where $m = 0$, 1 or 2, $z = 0$ or 1, $0<(m+z)<3$, and X is $—CH_2—CH_2—$, $—CH_2—CHOH—$,



and, when $m = 0$ and $z = 1$, is also $—CH=CH—$ or



Y is divalent straight chain alkylene of 4 to 8 carbon atoms or

$—CH_2CH=CH(CH_2)_3—$;

R is alkyl of 4 to 7 carbon atoms.

4,089,898

11-DEOXYPROSTAGLANDIN DERIVATIVES

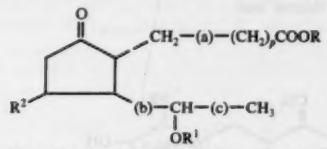
Nedumparambil A. Abraham, Dollard des Ormeaux; Jehan F. Bagli, Kirkland, and Tibor Bogri, Montreal, all of Canada, assignors to Ayerst, McKenna & Harrison Ltd., Montreal, Canada

Division of Ser. No. 489,856, Jul. 19, 1974, Pat. No. 4,006,136, which is a division of Ser. No. 238,650, Mar. 27, 1972, Pat. No. 3,849,474. This application Nov. 11, 1976, Ser. No. 741,077

Int. Cl.[2] C07C *177/00*

U.S. Cl. 260—514 D 2 Claims

1. A compound of the formula



in which (a) is C≡C, *p* is an integer from 2 to 4, (b) is trans CH=CH, (c) is $(CH_2)q$ wherein *q* is an integer from 1 to 6, R is hydrogen or lower alkyl, R^1 is hydrogen and R^2 is hydrogen or CH_2OH.

4,089,899

FERTILIZER COMPOUND OF THE UREAFORM TYPE AND A METHOD FOR THE PRODUCTION THEREOF

Dahlia Simeona Greidinger, Haifa, and Liuba Cohen, Kiryat Bialik, both of Israel, assignors to Fertilizers & Chemicals Limited, Haifa, Israel

Filed Mar. 26, 1976, Ser. No. 670,683

Claims priority, application Israel, Apr. 22, 1975, 47144

Int. Cl.[2] C07C *127/15;* C05C *00/00*

U.S. Cl. 260—553 R 6 Claims

1. A new compound of ureaform type prepared at a controlled reaction system, comprising the acid condensation of urea and formaldehyde, being characterized by a nitrogen content of over 41% by weight, consisting of cold water soluble nitrogen of about 60% of the total nitrogen as the main fraction and cold water insoluble nitrogen as the second fraction of about 40% of the total nitrogen and which is substantially free of hot water insoluble nitrogen and further characterized by the average degree of polymerization between the urea and formaldehyde residues being about 3 to 2 and not lower than 4 to 3, the overall concentration of the starting reagents being between 20% and about 40% by weight and the reaction being terminated prior to the formation of methylene urea products higher than tetramethylene pentaurea.

4,089,900

ANTIMICROBIAL AGENTS

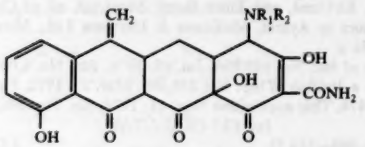
Robert K. Blackwood, Gales Ferry, and Charles R. Stephens, Jr., East Lyme, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 325,628, Jan. 22, 1973, which is a division of Ser. No. 114,038, Feb. 9, 1971, Pat. No. 3,824,285, which is a division of Ser. No. 667,357, Sep. 13, 1967, Pat. No. 3,622,627, which is a continuation-in-part of Ser. No. 360,435, Apr. 16, 1964, abandoned, which is a continuation-in-part of Ser. No. 247,874, Dec. 28, 1962, abandoned. This application Sep. 3, 1976, Ser. No. 720,145

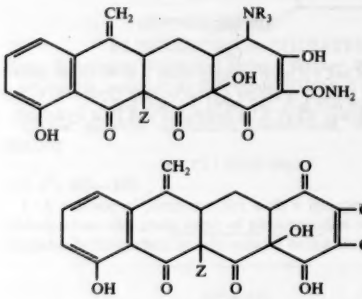
Int. Cl.[2] C07C *103/19*

U.S. Cl. 260—559 AT 2 Claims

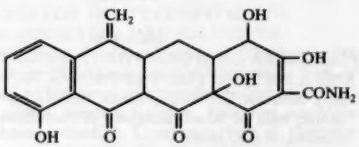
1. A compound selected from the group consisting of:



the acid addition salts and the alkali metal and alkaline earth metal salts thereof and



and



the alkali metal and alkaline earth metal salts thereof; wherein

R_1 is selected from the group consisting of hydrogen, benzyl, phenethyl, cyclohexyl and alkyl of from 2 to 6 carbon atoms;

R_2 is selected from the group consisting of hydrogen, alkyl of from 2 to 6 carbon atoms, and hydroxyalkyl of from 2 to 4 carbon atoms;

Z is selected from the group consisting of hydrogen, chloro and fluoro; and

R_3 is selected from the group consisting of OH, $NHCONH_2$, $NHC(NH)NH_2$, $NHCSNH_2$, 4-(β-hydroxyethyl)-piperazino, and NR_4R_5 wherein

R_4 is selected from the group consisting of hydrogen, alkyl of from 1 to 6 carbon atoms, phenyl, benzyl and cyclohexyl and

R_5 is selected from the group consisting of hydrogen, alkyl of from 1 to 6 carbon atoms, phenyl and benzyl.

4,089,901

PROCESS FOR CONVERTING POLYAMINOPOLYARYL-METHANES INTO DIAMINODIARYLMETHANES

Peter Ziemek, Cologne; Roderich Raue, Leverkusen, and Hans-Josef Buysch, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

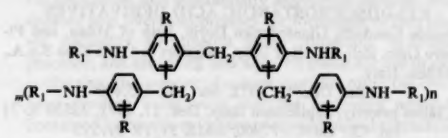
Filed Feb. 12, 1974, Ser. No. 441,931

Claims priority, application Germany, Feb. 17, 1973, 2308014

Int. Cl.[2] C07C *85/24*

U.S. Cl. 260—570 D 5 Claims

1. A process for the preparation of diaminodiarylmethanes containing 2,4'-diaminodiarylmethanes which comprises heating a mixture of a polyarylamine of the general formula



in which

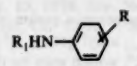
n represents an integer of from 0 to 2,

m represents an integer of from 0 to 2,

R represents hydrogen, a halogen atom, an alkyl group containing 1 to 4 carbon atoms, an alkoxy group containing 1 to 4 carbon atoms, an aralkyl group containing 7 to 10 carbon atoms or a condensed benzene ring, and

R_1 represents hydrogen or an alkyl group containing 1 to 4 carbon atoms

with a monoarylamine of the general formula



in which

R and R_1 have the meanings indicated above and water in the presence of a solid acid catalyst which is insoluble in the reaction mixture.

4,089,902

DIALLYLAMINOMETHYL-RESORCINOLS

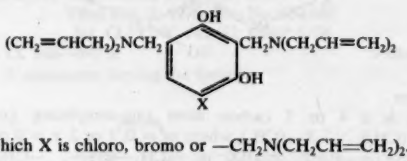
Eiichi Morita, Copley, Ohio, assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 248,067, Apr. 27, 1972, Pat. No. 3,798,051. This application Nov. 5, 1973, Ser. No. 412,971

Int. Cl.[2] C07C *87/28*

U.S. Cl. 260—570.9 4 Claims

1. The composition of the formula



in which X is chloro, bromo or $—CH_2N(CH_2CH=CH_2)_2$.

4,089,903

PREPARATION OF VICINAL-CHLORAMINOALKANES FROM ALPHA-OLEFINS CHLORAMINES AND ALUMINUM HALIDE CATALYSTS

Joanne R. Whittle, Nederland, and Orville W. Rigdon, Groves, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Jun. 28, 1976, Ser. No. 700,625

Int. Cl.[2] C07C *85/18*

U.S. Cl. 260—583 G 5 Claims

1. A process for preparing alkyl amines possessing vicinal chlorine and an amino group which comprises:

(a) forming a chilled reaction mixture solution of alpha olefins containing from 4 to 20 carbon atoms and a chloroamine selected from the group consisting of monochloramine and N-alkylchloroamines, in the presence of a polychlorinated dispersing inert solvent and an aluminum chloride catalyst;

(b) maintaining the chilled reaction mixture at about − 50° to − 10° C for 1 to 3 hours, washing the organic layer with diluted HCl to remove catalyst residues and separating the organic layer rich in product from the water layer.

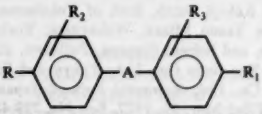
4,089,904

PROCESS FOR SELECTIVELY PRODUCING HIGH-YIELD, HIGH-PURITY 4,4-SUBSTITUTED DIARYL SULFONES

Merle E. Cisney, and Neil J. Lasater, both of Camas, Wash., assignors to Crown Zellerbach Corporation, San Francisco, Calif.

Filed Apr. 11, 1975, Ser. No. 567,350
Int. Cl.² C07C *147/06*
U.S. Cl. 260—607 AR **16 Claims**

1. A process for selectively forming a high-purity, light-colored 4,4′-substituted diaryl sulfone product, having an absorbency of not more than about 0.50 absorbence units, as measured on a 25% solution by weight in methanol of said sulfone product at a wave length of 450 n.m., and having a yield of at least 90% by weight, which comprises reacting, in a highly acidic, aqueous slurry, a 4,4′-substituted diaryl reactant compound comprising the structural formula



wherein A is sulfide or sulfoxide, R and R_1 are OH, halogen, H, alkoxy, or alkyl, and R_2 and R_3 are H, halogen, or an alkyl group having from one to three carbon atoms, an oxidizing agent comprising a peroxide compound, and a catalyst compound selected from the group consisting of molybdic acid and a salt thereof, the level of acidity of said aqueous slurry being maintained at a pH of less than one.

4,089,905

METHOD FOR THE PREPARATION OF POLYTHIOETHERS FROM THIODIETHANOL USING HETEROGENEOUS MIXED METAL OXIDE CATALYSTS

Ajaib Singh, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Oct. 27, 1976, Ser. No. 736,023
Int. Cl.² C07C *148/00*
U.S. Cl. 260—609 R **7 Claims**

1. A method for the preparation of polycondensation oligomers of thiodiethanol with a molecular weight of about 300 to about 4100 which comprises condensing thiodiethanol or a mixture of a major proportion of thiodiethanol and one or more aliphatic diols at a temperature ranging from about 150° to about 200° C in the presence of about 0.5 to 20 percent by weight of a heterogeneous, acid acting, metal oxide catalyst consisting essentially of silica-alumina; admixtures of silica, alumina, or silica-alumina with calcium oxide, magnesium oxide, boron oxide, molybdenum oxide or tungsten oxide; acid washed acidic clays or acid acting metal oxides having acidic groups on their surface structure; said metal oxide catalyst being such that the pH of an aqueous slurry of a 5 gram portion of the catalyst in 50 ml. of water after stirring for 5 minutes is the same or lower than the pH of a 1 gram portion of the catalyst in 50 ml. of water after stirring for 5 minutes.

4,089,906

METHOD FOR THE PREPARATION OF POLYTHIOETHERS FROM THIODIETHANOL USING ACIDIC CARBON

Ajaib Singh, Somerville, N.J., and Joseph Lawrence Schmitt, Jr., Bethel, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 27, 1976, Ser. No. 736,024
Int. Cl.² C07C *148/00*
U.S. Cl. 260—609 R **4 Claims**

1. A method for the preparation of polycondensation oligomers of thiodiethanol with a molecular weight of about 300 to 5,300 which comprises condensing thiodiethanol or a mixture of a major proportion of thiodiethanol and one or more aliphatic diols at a temperature ranging from above about 150° C to 210° C in the presence of from about 0.5 to 20 percent by weight of an acid-acting carbon catalyst consisting essentially of acidic activated carbon and acidic activated charcoal, the acidity thereof being due to acidic sites on the catalyst surface, said catalyst being such that the pH of an aqueous slurry of a 5 gram portion of the catalyst in 50 ml. of water after stirring for 5 minutes is the same or lower than the pH of a 1 gram portion of the catalyst in 50 ml. of water after stirring for 5 minutes.

4,089,907

ORGANOMETALLIC COMPLEXES AS OXIDATION CATALYST

Howard P. Angstadt, Media, Pa., assignor to Sun Ventures, Inc., St. Davids, Pa.

Continuation-in-part of Ser. No. 787,582, Dec. 27, 1968, abandoned. This application Nov. 18, 1974, Ser. No. 524,911
Int. Cl.² C07C *179/04*
U.S. Cl. 260—610 B **13 Claims**

1. In the process for the catalytic oxidation of aliphatic or alicyclic olefins having at least one hydrogen atom on the α-carbon atom, said olefins having from 3 to 19 carbon atoms, or secondary or tertiary alkylaromatic hydrocarbons of the formula

wherein R is lower alkyl; R_1 is lower alkyl or hydrogen; and Ar is an aromatic nucleus selected from the group consisting of phenyl and naphthyl, in the presence of air or oxygen at a temperature of from about 80° to 150° C to form hydroperoxides, the decomposition products thereof, or mixtures of the same, the improvement wherein the catalyst is of the formula

$$MX_n(TAU)_m$$

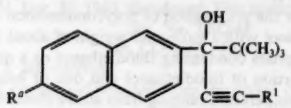
where TAU is a tetraalkylurea, the alkyl moiety of which has from one to four carbon atoms; MX is a metal salt wherein M is a transition metal cation of Group IB, IIB, IIIB, IVB, VB, VIB, VIIB, VIIIB or IIA of the Periodic Table and X is the anion of said metal salt; *m* is an integer of from 1 to 8; and *n* is an integer of from 1 to 4, wherein the ratio of said catalyst to said olefin or alkylaromatic hydrocarbon is from about 0.01 to 5.0 parts by weight of catalyst per 100 parts by weight of olefin or alkylaromatic hydrocarbon.

4,089,908
SUBSTITUTED METHANOLS

Faizulla G. Kathawala, West Orange, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation of Ser. No. 480,054, Jun. 17, 1974, abandoned. This application Apr. 30, 1976, Ser. No. 682,087
Int. Cl.[2] C07C *43/20*
U.S. Cl. 260—613 D 5 Claims

1. A compound of the formula



wherein

R^1 is a hydrogen atom or alkyl having from 1 to 4 carbon atoms; and

R^a is a hydrogen atom, halogen having an atomic weight of from about 19 to 36, alkyl having from 1 to 4 carbon atoms, or alkoxy having from 1 to 4 carbon atoms.

4,089,909
SEPARATION OF DICHLOROBENZENE ISOMERS

Joseph E. Milam; Warren E. Dean, and Robert K. Gerdes, all of New Martinsville, W. Va., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 22, 1976, Ser. No. 725,221
Int. Cl.[2] C07C *25/10*
U.S. Cl. 260—650 R 5 Claims

1. A process for preferentially chlorinating metadichlorobenzene to form 1,2,4-trichlorobenzene and higher polychlorobenzenes in a substantially dichlorobenzene mixture comprising at least 20 weight percent each of metadichlorobenzene, orthodichlorobenzene and paradichlorobenzene by reacting said mixture with elemental chlorine in a liquid phase Friedel-Crafts catalyst assisted chlorination at a temperature between 20° and 180° C. for a time sufficient to give a reaction product having a degree of chlorination between 2.1 and 2.8.

4,089,910
THERMOSETTING POWDER COATING COMPOSITIONS

Minoru Shibata; Naozumi Iwasawa; Tadashi Watanabe, and Ichiro Yoshihara, all of Hiratsuka, Japan, assignors to Kansai Paint Co., Ltd., Amagasaki, Japan

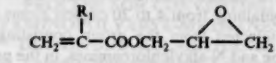
Filed Jun. 20, 1975, Ser. No. 588,709
Claims priority, application Japan, Jun. 26, 1974, 49-73096
Int. Cl.[2] C08L *63/00*
U.S. Cl. 260—836 17 Claims

1. A thermosetting powder coating composition which comprises:

(A) a graft copolymer of

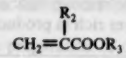
a. 10 to 40 percent by weight of a linear polyester having a number average molecular weight of 600 to 3,000 and containing one ethylenically unsaturated double bond only at one end of the molecule, said linear polyester being prepared by condensing a monohydroxy-monocarboxylic acid having one carboxylic acid at the end of the molecule and one hydroxyl group in the molecule or a mixture of said acids and monocarboxylic acid of up to 20 mole % based on said monohydroxy monocarboxylic acid and reacting the condensed product with glycidyl acrylate, glycidyl methacrylate and mixtures thereof,

b. 5 to 30 percent by weight of at least one of glycidyl esters having the formula

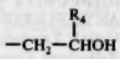


wherein R_1 is hydrogen or methyl, and

c. 10 to 85 percent by weight of at least one of acrylic compounds having the formula



wherein R_2 is hydrogen or methyl and R_3 is alkyl having 1 to 14 carbon atoms, cyclohexyl or hydroxyalkyl represented by



wherein R_4 is hydrogen or alkyl having 1 to 2 carbon atoms, said graft copolymer having a softening point of 70° to 110° C and a number average molecular weight of 2,000 to 30,000 and

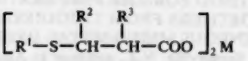
(B) at least one of polycarboxylic acids and anhydrides thereof in an amount of 0.6 to 1.2 moles in terms of carboxyl group per mole of the glycidyl group contained in the graft copolymer.

4,089,911
PROCESS FOR IMPROVING THE THERMAL STABILITY OF POLYURETHANE-CONTAINING RESIN COMPOSITION

Yoshio Itoh; Kakuji Satoh, both of Yokohama; Yuji Suzuki, Wakayama; Yasuo Miura, Wakayama; Yoshiteru Kazama, Wakayama, and Saburo Yazawa, Fujisawa, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo and Sankyo Organic Chemicals Co., Ltd., Kawasaki, both of, Japan

Filed Mar. 21, 1977, Ser. No. 779,481
Claims priority, application Japan, Apr. 30, 1976, 51-49426
Int. Cl.[2] C08L *75/00*
U.S. Cl. 260—859 PV 16 Claims

1. A moldable resin composition whose resin ingredients consist essentially of (A) polyurethane resin and (B) polyvinyl chloride resin, blended in a weight ratio A/B of from 9/1 to 3/7, said resin composition containing blended therein (C) from 0.1 to 10 parts by weight, per 100 parts by weight of the sum of A and B, of a thermal stabilizer or mixture of thermal stabilizers having the formula



wherein

R^1 is cycloalkyl, alkenyl, aralkyl or alkyl having 4 to 18 carbon atoms,

R^2 and R^3 which can be the same or different, are hydrogen, methyl, ethyl or aryl, and

M is barium, calcium or magnesium.

4,089,912
STABILIZED FLAME-RETARDANT STYRENIC POLYMER COMPOSITIONS AND THE STABILIZING FLAME-RETARDANT MIXTURES USED THEREIN

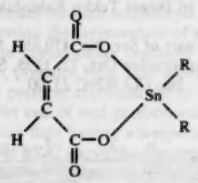
Robert P. Levek, and David O. Williams, both of West Lafayette, Ind., assignors to Great Lakes Chemical Corporation, West Lafayette, Ind.

Filed Jul. 28, 1976, Ser. No. 709,512
Int. Cl.[2] C08K *3/20, 5/13;* C09K *3/28, 15/32*
U.S. Cl. 260—862 16 Claims

1. A stabilized flame-retardant polymer composition comprising a normally combustible styrenic polymer, about 2–15

phr antimony trioxide, about 4–30 phr of a bromine-containing flame retardant agent, and about 0.5–3.0 phr of a stabilizing composition comprising:

about 50–80% of a dialkyltin maleate of the formula



where R is a C_1–C_8 alkyl radical;

about 5–15% of a hindered phenolic antioxidant; and

about 5–45% of a member selected from the group consisting of an anhydride of a cyclic dicarboxylic acid, C_1–C_8 alkyl ester derivatives thereof, imide derivatives thereof, polymeric esters of acrylic and methacrylic acids, poly(alkene-vinyl acetate) copolymers, and poly(diallylphthalate), by weight of the stabilizing composition.

4,089,913

PROCESS FOR PRODUCING TRANSPARENT BLOCK COPOLYMER RESIN

Tamotsu Miki; Shizuo Narisawa; Ichiro Ichikawa, and Hideki Horiike, all of Ichihara, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 538,409, Jan. 3, 1975, abandoned. This application Feb. 27, 1976, Ser. No. 662,019

Claims priority, application Japan, Jan. 10, 1974, 49-6370; Jun. 8, 1974, 49-65148

The portion of the term of this patent subsequent to Oct. 18, 1994, has been disclaimed.

Int. Cl.[2] C08F *297/04*

U.S. Cl. 260—880 B **27 Claims**

1. In a process for producing a transparent block copolymer resin by block-copolymerizing 90 to 65 parts by weight of a vinyl aromatic compound monomer and 10 to 35 parts by weight of a conjugated diene monomer in a hydrocarbon solvent using an organolithium compound as initiator in the presence or absence of 0.01 to 5 mole-% based on the total monomer of a Lewis base compound to form a block copolymer in which each polymer molecule has at least one plastic region comprising a homopolymer of the vinyl aromatic compound and at least one elastomeric region comprising a random copolymer of the vinyl aromatic compound and the conjugated diene, the improvement which comprises

forming said plastic region by homopolymerizing 50 to 90% by weight of the total vinyl aromatic compound monomer and said random copolymerized elastomeric region by adding continuously to the polymerization system a monomer mixture of a fixed composition, in which the weight ratio of the vinyl aromatic compound monomer to the conjugated diene monomer is 0.1 to 3.0, and under polymerization conditions at such a rate that the fed monomers will polymerize instantly and thus will not accumulate in the polymerization system, the resulting block copolymer having a mean molecular weight of 0.35 to 1.8 dl/g in terms of intrinsic viscosity as measured in toluene at 30° C.

4,089,914

ACCELERATION DEVICE IN A CARBURETOR

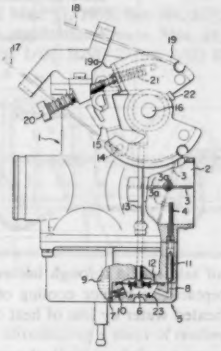
Yuichi Yoshioka, Asaka, and Yoshikatsu Nakano, Kawagoe, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 12, 1976, Ser. No. 713,970

Claims priority, application Japan, Aug. 18, 1975, 50-113022[U]

Int. Cl.[2] F02M *7/08*

U.S. Cl. 261—34 A **2 Claims**



1. An acceleration device in a carburetor having an intake duct with an upstream side and a downstream side, said acceleration device comprising an acceleration pump operable in response to an engine acceleration operation, said acceleration pump having an inlet side and a delivery side, a choke valve disposed in the upstream side of the intake duct, and an acceleration fuel spray nozzle connected to the delivery side of said acceleration pump and projecting laterally into said intake duct on the upstream side of said choke valve, said nozzle comprising a tube having an axial bore, an outlet opening extending laterally into said bore and facing downstream in said duct, and being closed to flow proceeding downstream in said duct, said choke valve having an aperture therein in immediate proximity to the outlet opening of said acceleration fuel spray nozzle when said choke valve is closed whereby said nozzle discharges a spray of fuel through said aperture, said choke valve being pivotable about a central portion and including upper and lower portions, said lower portion being provided with the aperture, said outlet opening facing said aperture in said lower portion when the choke valve is closed.

4,089,915

SELF-STERILIZING HUMIDIFIER

Richard R. Jackson, Eight Trinity Rd., Marblehead, Mass. 01947

Filed Nov. 15, 1976, Ser. No. 741,705

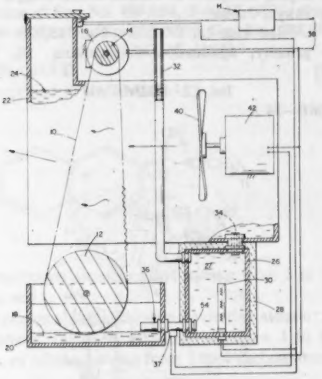
The portion of the term of this patent subsequent to May 31, 1994, has been disclaimed.

Int. Cl.[2] B01F *3/04*; F24F *13/04*

U.S. Cl. 261—39 R **12 Claims**

1. In a humidifier for air to be breathed of the type having an endless form of porous media associated with a drive for moving said media progressively through immersion and air humidification stations, a water receptacle at said immersion station through which the corresponding portion of media passes to be wetted and an air flow path at said humidification station for passing air to be humidified through wetted media, the improvement comprising means for periodically providing throughout the effective volume of water in said receptacle a heated water temperature above about 180° F while said drive is actuated, the heated water being sufficient to expose progressively media throughout a full cycle of movement of said media to bacteria-killing conditions, whereby said media is

periodically sterilized and prevented from being a source of continued growth of bacteria and infection, said humidifier including means to de-energize a blower in said air flow path



during passage of said media through bacteria-killing conditions in said receptacle, to reduce cooling of said media and thereby of said heated water by loss of heat of vaporization.

4,089,916

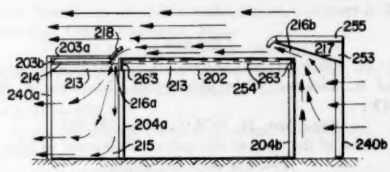
PROCESS AND APPARATUS FOR MODULATING TEMPERATURES WITHIN ENCLOSURES

Harold R. Hay, 2424 Wilshire Blvd., Los Angeles, Calif. 90057

Continuation-in-part of Ser. No. 114,977, Feb. 17, 1971, Pat. No. 3,903,958, and Ser. No. 815,785, Apr. 14, 1969, Pat. No. 3,563,305, and Ser. No. 482,027, Aug. 16, 1963, Pat. No. 3,299,589, and Ser. No. 610,597, Jan. 20, 1967, Pat. No. 3,450,192, and Ser. No. 163,381, Dec. 19, 1961, abandoned, and Ser. No. 668,202, Jun. 26, 1957, abandoned. This application Sep. 8, 1975, Ser. No. 611,408

Int. Cl.[2] F02M *23/14*

U.S. Cl. 261—153 **9 Claims**



1. An apparatus for influencing the temperature of space at least partially enclosed within a structure by means of a liquid suitably supported and overlying said space and having in combination:

a. means disposed outwardly from the exterior of said structure at least partially enclosing said space which outwardly-disposed means conjointly with the external surface of said structure form a wind-trapping element, and

b. means for causing air external to said structure and entering said wind-trapping element to flow substantially parallel to and near the surface of said liquid whereby said liquid is thermally affected by the flowing air and said thermal effect is transferred to said space.

4,089,917

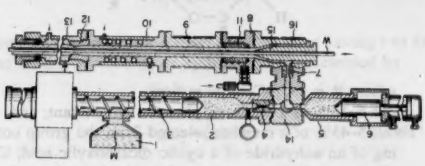
PROCESS OF CROSS-LINKING AND EXTRUSION MOLDING THERMOPLASTIC POLYMERS

Mamoru Takiura, Kawasaki; Susumu Nakajyo, Tokyo; Noriyuki Kikuchi, Kawaguchi, and Masahiko Ishida, Yokohama, all of Japan, assignors to Ikegai Tekko Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 470,656, May 16, 1974, abandoned. This application Oct. 22, 1975, Ser. No. 624,992

Int. Cl.[2] B29C *25/00*

U.S. Cl. 264—40.3 **3 Claims**



1. A process for cross-linking and extrusion molding a cross-linkable resin, comprising the steps of:

1. feeding a charge of cross-linkable moldable resin and an amount of cross-linking agent capable of cross-linking said resin into a preliminary plasticizing chamber and therein plasticizing said charge under conditions of temperature and pressure which are insufficient to cause the cross-linking reaction to start so that the charge of plasticized material in said plasticizing chamber does not undergo cross-linking;

2. feeding said plasticizing charge under pressure from said preliminary plasticizing chamber through a first discharge passage having between its ends an elongated first orifice of smaller cross-sectional area than the cross-sectional areas of the portions of said first discharge passage on either side of said first orifice, said first orifice being effective for imparting a high pressure and a strong shearing action to said charge as it passes through said first orifice and thereby rapidly raising the temperature of the charge to a temperature at which the resin is molten and the cross-linking reaction is started, then flowing the charge, which is undergoing cross-linking, under pressure into the forward end of an accumulator chamber which is isolated from the below-mentioned preform extrusion die and which has a reciprocable plunger therein located close to the forward end of said accumulator chamber, while continuously imposing a constant static back pressure on said plunger in said accumulator chamber to resist retracting movement thereof so that the charge of plasticized material entering the forward end of said accumulator chamber from said first orifice forces said plunger to retract in said accumulator chamber against said back pressure and fills said accumulator chamber and said charge is continuously subjected to said back pressure, and operating valve means to close communication between said plasticizing chamber and said accumulator chamber when said charge has been fed into said accumulator chamber;

3. holding the charge in said accumulator chamber under a pressure and temperature higher than that previously applied on said charge in said plasticizing chamber to render uniform the temperature of the charge in said accumulator chamber and to cause the cross-linking reaction to progress;

4. after said cross-linking reaction has progressed partway to completion but while said charge remains fluid, operating said valve means to place said accumulator chamber in communication with a second discharge passage having between its ends an elongated second orifice of smaller cross-sectional area than the cross-sectional areas of the portions of said second discharge passage on either side thereof, said second discharge passage having an elon-

gated preform extrusion die connected in series therewith, advancing said plunger in said accumulator chamber to discharge said fluid charge therefrom and flowing said fluid charge through said second orifice and imparting a high pressure and a strong shearing action to said fluid charge as it passes through said second orifice and thereby rapidly increasing the temperature of said fluid charge to accelerate the cross-linking reaction, flowing said fluid charge under pressure from said second orifice into and through said preform extrusion die to form an extrudate, and in the inlet end of said preform extrusion die flowing an inert heating fluid having a temperature of from 20° C below to about 20° C above the temperature of the extrudate, under pressure against the exterior of the extrudate and between said exterior and the interior wall of said preform extrusion die to maintain a pressure of above 15 kg/cm^2 on the extrudate and to maintain the temperature of the extrudate to complete the cross-linking reaction whereby said extrude is maintained under high pressure and high temperature in the inlet end of said preform extrusion die and moves therethrough in substantially plug flow;

5. then moving the extrudate from said preform extrusion die through a cooled die to rigidify the extrudate and terminate cross-linking, the charge being continuously maintained under pressure throughout the foregoing steps **2** to **5**, and

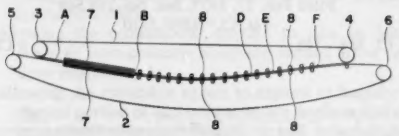
6. then discharging the cooled extrudate.

4,089,918

PROCESS FOR THE CONTINUOUS CASTING OF LIQUID POLYMERIZABLE COMPOSITIONS

Yasuyuki Kato; Masahiko Moritani, and Seiichi Suzuki, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 23, 1975, Ser. No. 643,631
Claims priority, application Japan, Dec. 25, 1974, 49-3700
Int. Cl.² B29D *7/14*
U.S. Cl. 264—40.7 **8 Claims**



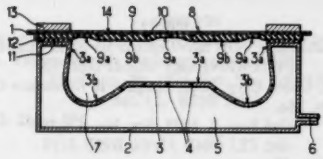
1. A process for continuously casting a liquid polymerizable composition which comprises feeding the liquid polymerizable composition, together with a pair of continuous gaskets, into a spacing defined between the lower run of the upper belt and the upper run of the lower belt both of which are arranged such that the pair of the endless belts are driven concurrently in the same direction at substantially the same speed, said gaskets being arranged so as to circumscribe the spacing serving as a pair of seals to confine a cavity whilst moving concurrently with the belts in contact with the opposing surfaces of the belts, passing the composition through a portion of the path of the belts where said composition is partially polymerized to such a viscosity that a common logarithm of its viscosity in terms of poise at the temperature of polymerization is within a range of 2 to 5, passing the resultant composition through a portion of the path thereof which is arranged so as to be curved at least once until the composition reaches a degree of polymerization within a range of about 40 to 60 weight percent based on the total weight of the composition, and thereafter passing through a straight portion of the path thereof for complete polymerization, while heat is applied to substantially the entire path thereof, said path for polymerization being arranged such that the lower and upper runs of the respective belts are brought closer together to follow shrinkage of the composition during the course of the polymerization, and removing the polymerized plate from the end portion of the belts at the discharge side thereof.

4,089,919

METHOD OF RESHAPING RESILIENTLY DEFORMABLE SHEET MATERIAL FOR INTEGRATION WITH A FLEXIBLE PLASTIC FOAM AS A COVER THEREFOR

Joseph F. Sanson, Beaugency, France, assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Mar. 11, 1975, Ser. No. 557,247
Claims priority, application France, Mar. 19, 1974, 74 09249
Int. Cl.² B29C *1/04;* **B29D** *27/04, 9/00;* **B29C** *17/04*
U.S. Cl. 264—46.6 **5 Claims**



1. In a method of reshaping a sheet of resiliently deformable material impervious to fluid to define a cover for a flexible plastic foam molded in situ whereby said resilient foam cover is integrated with the foam to produce a pliably resilient product, said covered foam product being of non-uniform depth contour, the improvement which comprises:

providing a female mold having an open face and a cavity of non-uniform depth contour opening onto said face;

disposing a fluid-pervious elastic diaphragm across the open face of said mold cavity;

superimposing said deformable sheet in surface contact with said diaphragm on its exposed face and sealingly fixing said sheet and diaphragm around the periphery of the mold cavity;

creating a pressure differential across said sheet and diaphragm and thereby deforming them resiliently inwardly of said cavity and stretching them concommitantly within the periphery of said mold cavity to form in said deformable sheet a mold-configured cavity of non-uniform depth into which a foam mixture can be cast while said sheet is held in said mold;

restricting sliding of the surface of said diaphragm, facing said cover sheet, relative said cover sheet during said stretching by using for said diaphragm a sheet having an elastomeric surface which resists said sliding; and facilitating sliding of an opposite side of said diaphragm on a surface of said mold during said stretching and causing a portion of said diaphragm to slide on a surface defining said mold cavity at some time during said stretching; thereby stretching said cover sheet uniformly and simultaneously while under positive control of said diaphragm.

4,089,920

HIGH-STRENGTH, LIGHT-WEIGHT, FIRED CLAY BODY AND METHOD OF PRODUCING SAME

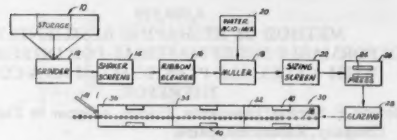
John A. Stephens, 4400 Via Abrigada, Hope Ranch, Santa Barbara, Calif.; Eugene H. Benvau, 4632 W. Ave. 40, Los Angeles, Calif., and Lee R. Benvau, 633 S. Main, Burbank, Calif. 91506

Filed Dec. 14, 1970, Ser. No. 97,636
Int. Cl.² C04B *33/24*
U.S. Cl. 264—63 **8 Claims**

1. The method of producing a light-weight, high-strength fired clay body which includes the steps of:

forming a compacted unfired body from granular materials

which include a major proportion of plastic, low-firing clay and grog; and



heating the clay body sufficiently to cause the outer layer thereof to oxidize to maturity and to shrink, while the center portion of said body remains substantially unoxidized and with a lesser amount of shrinkage.

4,089,921

PROCESS FOR SINTERED BI-METALLIC FILAMENTARY COMPOSITES

Emerick J. Dobo, Cary, N.C., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 5, 1975, Ser. No. 629,184
Int. Cl.² C04B *35/64;* B29F *3/10*
U.S. Cl. 264—63 **4 Claims**

1. A method for producing a bi-metallic composite filament with the aid of a fiber-forming polymer, said method comprising the following steps in sequence:

(a) providing a first and second spinning dope, wherein said first spinning dope is comprised of particles of a first reducible metal oxide uniformly dispersed in a fiber-forming polymer solution and said second spinning dope is comprised of particles of a second reducible metal oxide uniformly dispersed in a fiber-forming polymer solution, wherein the particles of said first and second reducible metal oxides have an average diameter of less than about 5 microns, and wherein the metal component of each of said reducible metal oxides is sinterable at a temperature below the melting temperature of the other;

(b) simultaneously extruding said first and second spinning dopes through an orifice to form a unitary precursor filament having a first longitudinally extending layer along its length which contains the particles of said first reducible metal oxide, and an adhering second essentially distinct longitudinally extending layer extending along the filament length which contains the particles of said second reducible metal oxide; and

(c) exposing said precursor filament to a reducing environment consisting essentially of hydrogen gas or a mixture of hydrogen and carbon monoxide gases at a temperature and for a period of time sufficient to effect a reduction and sintering of said metal particles, said temperature being below the melting point of the metal particles and above the vaporization or decomposition temperature of the non-metal components of said precursor filament.

4,089,922

MOLDED ARTICLE HAVING STEREOSCOPIC DECORATIVE PATTERN AND FABRICATION PROCESS THEREFOR

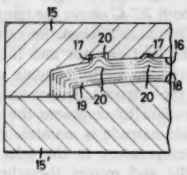
Tadao Saito; Takamitsu Nozawa, and Nobuo Yamanka, all of Tokyo, Japan, assignors to Yoshino Kogyosho Co., Ltd., Tokyo, Japan

Division of Ser. No. 547,812, Feb. 7, 1975. This application Jun. 17, 1976, Ser. No. 697,203
Int. Cl.² B29D *3/02*
U.S. Cl. 264—108 **3 Claims**

1. A process for fabricating a molded article having a decorative appearance which is viewable as a stereoscopic image from the outside, comprising the steps of:

prefabricating by injection molding an object of a material which consists essentially of a synthetic resin and a filler, in a mold having recessed portion into which said materials flows, thereby forming a relief pattern on a surface thereof and forming flow marks corresponding to the relief pattern in the material;

subjecting the object formed in said prefabricating step to a further injection molding process to form a covering layer over said surface, said covering layer being of a material consisting of a synthetic resin and a filler and having an appearance different from that of the prefabricated object, said covering layer having a further relief pattern on its surface positioned such that even the lowermost projection of the relief pattern of the prefabricated objects projects beyond a background level of said covering layer and having further flow marks corresponding to the further relief pattern;



planing away the resultant relief pattern to form a generally smooth surface on the object at said background level; and polishing the smooth surface;

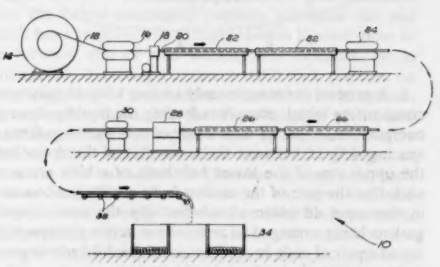
whereby a stereoscopic image corresponding to the combined relief patterns is formed by shading due to the substantially radial reflection of light incident upon the flow marks.

4,089,923

MANUFACTURE OF SUBMARINE CABLE

Charalambos Georgiou Theodossi, San Diego, and David Arthur Hibbs, Chula Vista, both of Calif., assignors to International Telephone & Telegraph Corporation, New York, N.Y.

Filed Feb. 17, 1977, Ser. No. 769,569
Int. Cl.² B29F *3/10*
U.S. Cl. 264—146 **6 Claims**



1. In a method of manufacturing a submarine coaxial cable, the steps comprising:

extruding a dielectric around the center conductor for the cable;

cooling in a liquid the dielectric covering on the center conductor to a stabilized profile; and

thereafter sizing the dielectric covering to remove the outer layer thereof contacted by the cooling liquid prior to appreciable permeation of cooling liquid from the outer region of the dielectric into the inner region thereof.

5. An apparatus for manufacturing submarine coaxial cable comprising:

means for extruding a dielectric around the center conductor for the cable;

means for cooling the dielectric covered center conductor as

it emerges from said extrusion means, said cooling means including a receptacle for containing a cooling liquid;
dielectric sizing means separate from but in tandem with said extrusion means and said cooling means for removing the outer layer of the dielectric; and
means for drawing the center conductor through said extrusion means, cooling means and sizing means in sequence.

4,089,924

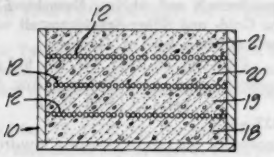
PROCESS FOR MAKING CAST ARTICLES HAVING A FRACTURED SURFACE

Max E. Mann, 19201 Hamilton St., Gardena, Calif. 90247

Continuation of Ser. No. 531,607, Dec. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 327,470, Jan. 29, 1973, abandoned. This application Jun. 28, 1976, Ser. No. 700,540

Int. Cl.² B32B *3/02*

U.S. Cl. 264—157 **16 Claims**



1. A process for making structural members from a cementitious material, at least one of the finished surfaces of said structural member having an irregular fractured configuration, comprising the steps of:
placing a quantity of particulate expansive agents in a quantity of unset cementitious material in a stratum corresponding to the desired position of the fractured surface, said expansive agents having the ability to expand with an expansive force and the ability to delay said expansion until after the initial set of said cementitious material and being in sufficiently large concentration of produce said fractured surface;
allowing the cementitious mixture to take an initial set whereby intra-concrete bonds are formed in the cementitious mixture; and
allowing the expansive agents to expand to fracture a substantial portion of said intra-concrete bonds in said stratum to establish a fracture stratum in said structure member corresponding to the desired position of the fractured surface.

4,089,925

METHOD FOR MAKING FACED BLOCKS

Gerald Leon Stowe, 4571 NE. Viewcrest La., Albany, Oreg. 97321

Filed Aug. 6, 1975, Ser. No. 568,888

Int. Cl.² B28B *1/16*

U.S. Cl. 264—256 **1 Claim**

1. A method of making blocks comprising
(a) providing elongated, upright sidewalls
(b) interconnecting said sidewalls with a plurality of separator plates
(c) said separator plates being positioned to define a plurality of mold cavities
(d) driving opposed brads partially into the separator plates at opposite ends of each mold cavity at a position spaced from each of said sidewalls so that said brads project into the mold cavity
(e) placing insertion plates having a curved top portion in each mold cavity to rest against said brads to divide each mold cavity into a backing chamber and a facing chamber
(f) placing a first uncured, block material mix in each of said backing chambers to hold said plates against said brads and placing a second, uncured facing material mix in each of said facing chambers
(g) removing said insertion plates by lifting the curved top portions of said plates
(h) tamping said first and second mixes to join and adhere said mixes to one another and,
(i) curing the joined and adhered mixes to provide a block.

4,089,926

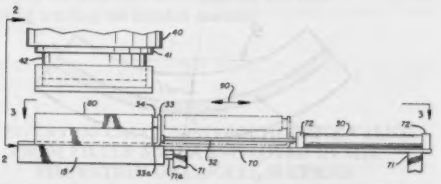
INJECTION MOLDING METHOD AND APPARATUS

Don A. Taylor, Box 4, Wadsworth, Ohio 44281

Filed Sep. 20, 1976, Ser. No. 725,013

Int. Cl.² B29F *1/08*

U.S. Cl. 264—294 **9 Claims**



1. Injection molding apparatus for use with a press movable between open and closed positions, comprising:
(A) a heated material supply source carried by one platen of the press;
(B) cavity bearing mold plates carried by the remaining platen of the press;
(C) a mechanical temperature control assembly including
(1) at least top and bottom rigid support plates,
(2) a layer of insulating material disposed beneath said top support plate, and
(3) at least one heating element disposed between said layer of insulating material and said bottom support plate;
(D) lateral transfer means
(1) disposed externally of the press for movement toward and away from said press and
(2) secured to said temperature control assembly;
(E) support means supporting said temperature control assembly in a position external to said platens to allow said material supply source to be moved into and out of contact and fluid communication with said cavity bearing mold plates upon movement of said platens;
(F) said temperature control assembly being sequentially movable between positions completely into and out of said press between the platens and between said material supply source and said cavity bearing mold plates upon opening thereof and actuation of said transfer means; and
(G) said material supply source contacting said top support plate and said cavity bearing mold plates contacting said bottom support plate upon closing of said press.

7. A method of injection molding using a press movable between open and closed positions and carrying a heated material supply source and a cavity bearing mold including the steps of:
(A) closing the press and injecting a charge of fluid material below scorch temperature for that material from the material supply source directly into the cavity of a cavity bearing mold;
(B) opening the press and releasing clamping pressure and

moving the material supply source away from the cavity bearing mold;

(C) moving a temperature control assembly from a position completely outside of the press to a position completely within the press and seating it on said cavity bearing mold;

(D) reapplying clamping pressure and moving said cavity bearing mold toward said material supply source with said temperature control assembly interposed therebetween; and

(E) inducing molding heat into said temperature control assembly.

4,089,927

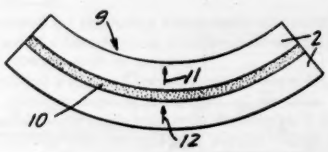
STRAIN SENSOR EMPLOYING BI LAYER PIEZOELECTRIC POLYMER

Allen L. Taylor, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 616,906, Sep. 26, 1975, Pat. No. 4,023,054, which is a continuation of Ser. No. 467,016, May 6, 1974, abandoned. This application Nov. 1, 1976, Ser. No. 737,215

Int. Cl.[2] H01L *41/10*

U.S. Cl. 310—331 **4 Claims**



1. A strain sensor for placement in surface-to-surface contact with an object for providing a detection of the strain gradient that is produced when a stress is placed on the object, which apparatus comprises:

a compliant piezoelectric strain sensing element having no conductive layers and comprising

two nonconductive strain sensitive poled piezoelectric polymeric sheets; and

a nonconductive separating layer between said piezoelectric sheets, said separating layer being less compliant than said piezoelectric sheets to provide a relatively stiff midsection in said element and about which the piezoelectric sheets will bend when the sensor is not attached to said object; and a compliant electrically conductive layer carried

on not more than one planar surface of said strain sensing element and in surface-to-surface contact with at least a portion of said object in order that said nonconductive piezoelectric strain sensing element will conform to the surface configuration of said portion of said object and produce an electrostatic latent charge pattern on its surfaces which varies in accordance with the change in the strain profile of said portion.

4,089,928

METHOD FOR INCREASING THE MnO_2 CONTENT OF NATURAL MANGANESE DIOXIDE ORE

Zafiris Foroglou, Athens, Greece, assignor to Eleusis Bauxite Mines-Mining Industrial and Shipping Inc., Athens, Greece

Filed Mar. 30, 1977, Ser. No. 783,023

Claims priority, application Greece, Mar. 30, 1976, 50428

Int. Cl.[2] C01G *45/02*

U.S. Cl. 423—49 **9 Claims**

1. A method for the production of active natural manganese dioxide mineral having a high percentage of MnO_2 and a low percentage of carbonates, which mineral provides improved electrochemical properties when employed in dry battery cells such as an increased delivery of current per unit of mass and improved stability of the employed heavy metals against solution in the electrolyte, the method comprising

(1) reacting an ore which contains natural manganese dioxide and significant amounts of carbonates with a solution of 2–4% hydrochloric acid, the reaction being conducted at ambient temperature and in an open vessel;

(2) allowing the reaction to proceed to completion, such that the carbonates react with the acid so as to produce water-soluble salts; and

(3) washing the reaction product in order to remove the water-soluble salts and thereby obtain a solid mineral product which is enriched in MnO_2.

4,089,929

PROCESS FOR THE PRODUCTION OF LOW-IRON ZEOLITIC ALUMINOSILICATES

Peter Christophliemk; Karl-Heinz Worms, and Gerald Schreiber, all of Dusseldorf, Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf-Holthausen and Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, both of, Germany

Filed Jul. 28, 1977, Ser. No. 819,666

Claims priority, application Germany, Aug. 6, 1976, 2635357

Int. Cl.[2] C01B *33/28*

U.S. Cl. 423—118 **16 Claims**

1. A process for the production of a low-iron zeolitic alkali metal aluminosilicate from iron-containing, optionally previously activated, mineral aluminosilicate raw materials comprising subjecting the iron-containing, optionally previously activated, mineral aluminosilicate raw material in a charge of suitable molar ratios of

$$M_2O : Al_2O_3 : SiO_2 : H_2O$$

where M is an alkali metal, by addition to the charge of sufficient caustic alkalis and optionally alkali metal silicate to give the desired molar ratio, to a hydrothermal crystallization treatment in the presence of an excess of alkali metal hydroxide to give a highly alkaline solution and sufficient of a water-soluble trialkanolamine to reduce the iron content of the crystalline zeolitic aluminosilicate formed, and recovering a low-iron zeolitic alkali metal aluminosilicate.

4,089,930

PROCESS FOR THE CATALYTIC REDUCTION OF NITRIC OXIDE

James R. Kittrell, Amherst, Mass., and Donald L. Herman, Yardley, Pa., assignors to New England Power Service Company, Westborough, Mass. and Northern Utilities Service Company, Newington, Conn.

Filed Feb. 12, 1976, Ser. No. 657,541

Int. Cl.[2] B01J *8/00; C01B 21/00*

U.S. Cl. 423—239 **7 Claims**

1. A method for the catalytic reduction of nitric oxide which includes:

(a) blending ammonia with a gaseous stream comprising nitric oxide and oxygen, the ammonia added in an amount sufficient to react with the total amount of nitric oxide in the stream to form a blended stream;

(b) placing the blended stream of step (a) in catalytic contact with a pretreated base metal catalyst at a temperature between about 300° F.–700° F. to reduce the nitric oxide to nitrogen while preventing the formation of nitrous oxide, the catalyst selected from the group consisting of copper, vanadium, iron and molybdenum and combinations thereof which catalyst has been contacted with a compound selected from the group consisting of sulfur, dimethyl sulfide, hydrogen sulfide and carbon disulfide and combinations thereof at a temperature of between about 400° F.–900° F. to form the pretreated catalyst.

4,089,931

PURIFICATION OF BORON NITRIDE

Ram A. Sharma, Sterling Heights, and Thompson G. Bradley, Rochester, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 22, 1977, Ser. No. 817,926
Int. Cl.[2] C01B 21/06
U.S. Cl. 423—290 3 Claims

1. A process for purifying boron nitride to remove boric oxide therefrom without increasing the electrical conductivity of the boron nitride comprising the steps of:

heating the boron nitride in a vacuum for a sufficient time and at a sufficient temperature to evaporate said boric oxide; and thereafter

exposing the boron nitride to chlorine to chlorinate any elemental boron formed during said evaporation and drive it off as boron trichloride.

4,089,932

PROCESS FOR THE PRODUCTION OF SPHERICAL SILICA GEL

Yazaemon Morita; Yukitoshi Kogure, both of Tokyo, and Akira Nomura, Kawasaki, all of Japan, assignors to Director-General of the Agency of Industrial Science & Technology, Tokyo, Japan

Filed Mar. 19, 1976, Ser. No. 668,615
Claims priority, application Japan, Apr. 3, 1975, 50-39829
Int. Cl.[2] C01B 33/12
U.S. Cl. 423—338 10 Claims

1. A process for the production of spherical silica gel which comprises emulsifying water glass in a dispersion medium composed of a mixture of, by volume, 20–60% n-hexanol as polar solvent and 40–80% liquid paraffin as non-polar solvent, said water glass being present in an amount of 0.01–20 parts by weight per 100 parts by weight of said dispersion medium, based on its silica content, to form a spherical silica sol; and thereafter gelling said sol while maintaining it in an emulsified state.

4,089,933

METHOD OF PRODUCING POLYCRYSTALLINE DIAMOND AGGREGATES

Leonid Fedorovich Vereschagin; Evgeny Nikolaevich Yakovlev, both of Moscow; Tatyana Dmitrievna Varfolomeeva, Moskoyskaya oblast; Alexandr Yakovlevich Preobrazhensky, Moscow; Vladislav Nikolaevich Slesarev, Moscow; Vasily Alexandrovich Stepanov, Moscow, and Ljudmila Efimovna Shterenberg, Moscow, all of U.S.S.R., assignors to Institut Fiziki Vysokikh Daleny Akademi Nauk, SSSR, Moskovskaya oblast, U.S.S.R.

Continuation of Ser. No. 645,097, Dec. 29, 1975, abandoned, which is a continuation of Ser. No. 563,467, Mar. 31, 1975, abandoned, which is a continuation of Ser. No. 103,128, Dec. 31, 1970, abandoned. This application Sep. 27, 1976, Ser. No. 726,819
Claims priority, application U.S.S.R., Jan. 4, 1970, 1513779
Int. Cl.[2] C01B 31/06; B01J 3/06
U.S. Cl. 423—446 1 Claim

1. In a method of producing polycrystalline diamond aggregates, wherein a carbon-containing material is given a required shape and in the presence of a catalyst subjected to a pressure of at least about 80 kbar and heated simultaneously to a temperature of at least about 1,500° C for a period of time sufficient for the formation of diamond aggregates, the improvement which comprises imparting to said carbon-containing material the shape of the required polycrystalline aggregate and providing said catalyst as an envelope in the form of powder surrounding said carbon-containing material, said catalyst transmitting pressure uniformly to said carbon-containing material in the course of compression, and said heating being effected by an electric pulse having a duration of from 0.1 to 10 seconds.

4,089,934

PROCESS FOR PREPARING CARBON PRODUCTS

Osamu Akiyoshi, Tokyo; Akio Mukai, Yokohama, and Yoshihiro Miwa, Chigasaki, all of Japan, assignors to Mitsubishi Chemical Industries Ltd. and Toyo Carbon Co., Ltd., both of Tokyo, Japan

Continuation of Ser. No. 644,423, Dec. 24, 1975, abandoned. This application Mar. 21, 1977, Ser. No. 779,570
Claims priority, application Japan, Dec. 28, 1974, 50-671
Int. Cl.[2] C01B 31/02, 31/04
U.S. Cl. 423—448 11 Claims

1. A process for preparing a carbon product, which comprises:

mixing a carbon material, a bitumen selected from the group consisting of coal tar, coal tar pitch, petroleum pitch, asphalt, liquified coal, and mixtures thereof, and an organic solvent to form a slurry such that said solvent selected is sufficient to dissolve at least a portion of the low molecular weight, γ-resins in said bitumen which are characterized by being soluble in quinoline and benzene, but not the high molecular weight components thereof, separating the liquid phase from the solid material of said slurry;

molding the separated solid material; and then

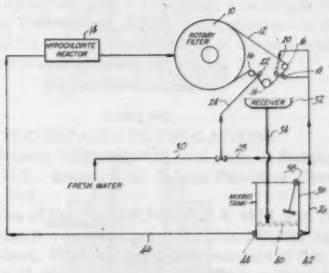
heating treating the molded material.

4,089,935

RECOVERY OF CALCIUM HYPOCHLORITE VALUES FROM FILTER MEDIA EMPLOYED IN THE FILTRATION OF $CA(OCL)_2$ SLURRIES

Paul M. Waxelbaum, and Duane A. Huston, both of Cleveland, Tenn., assignors to Olin Corporation, New Haven, Conn.

Filed Jul. 8, 1976, Ser. No. 703,391
Int. Cl.[2] C01B 11/04; B08B 7/00; B01J 1/00
U.S. Cl. 423—474 10 Claims



8. A process for recovering calcium hypochlorite values from a filter media containing deposits of calcium hypochlorite remaining on said filter media following the filtration of a first aqueous slurry of solid calcium hypochlorite to form a moist cake of calcium hypochlorite and removal of said cake from said filter media, said process which comprises the following steps:

a. Washing said filter media with a first aqueous solution to remove said deposits from said filter media and form a second slurry of calcium hypochlorite solids;

b. Collecting said second slurry in a receiver means;

c. Admixing said second slurry of calcium hypochlorite solids with an aqueous calcium hypochlorite solution in a mixing means to dissolve said calcium hypochlorite solids and to form a second aqueous solution containing from about 45 to about 215 grams per liter of $Ca(OCl)_2$; and

d. Recycling a portion of said second aqueous solution to step (a) as a portion of said first aqueous solution.

4,089,936
PRODUCTION OF HYDROGEN FLUORIDE

William Henry Thompson; Ralph Eric Worthington, and David John Stamper, all of Dublin, Ireland, assignors to Goulding Chemicals Limited, Dublin, Ireland

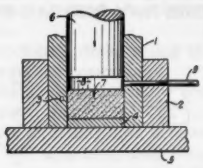
Division of Ser. No. 389,572, Aug. 20, 1973, Pat. No. 4,056,604. This application Sep. 20, 1976, Ser. No. 725,045
The portion of the term of this patent subsequent to Nov. 1, 1994, has been disclaimed.
Int. Cl.[2] C01B 7/22; C01D 3/02, 3/00
U.S. Cl. 423—483 1 Claim

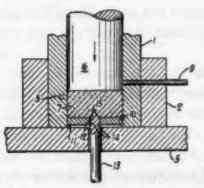
1. A process for the preparation of hydrogen fluoride, the process comprising heating ammonium fluoride in aqueous solution, in the presence of an amount of a soluble potassium fluoride in excess of the stoichiometric amount for reacting to form an aqueous solution of the bifluoride of the potassium, such that the weight ratio of fluoride ion to ammonium ion in solution is greater than 2.5 : 1, whereby the rate of reaction to form the bifluoride is increased, and recovering a solid product comprising potassium bifluoride from the solution substantially free from ammonia, reacting at least a portion of the potassium bifluoride with sodium fluoride to form sodium bifluoride, and decomposing the sodium bifluoride by heating to release hydrogen fluoride and to form a solid product comprising sodium fluoride.

4,089,937
METHOD OF MAKING AN IONIC FLUORIDE OPTICAL BODY WITH REDUCTION OF ABSORPTION BANDS

Carl F. Swinehart, University Heights, and Herbert Packer, Cleveland Heights, both of Ohio, assignors to The Harshaw Chemical Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 391,890, Aug. 27, 1973, Pat. No. 4,013,796. This application Mar. 21, 1977, Ser. No. 779,623
Int. Cl.[2] C01F 11/22, 17/00, 5/28; C01B 9/08
U.S. Cl. 423—490 8 Claims



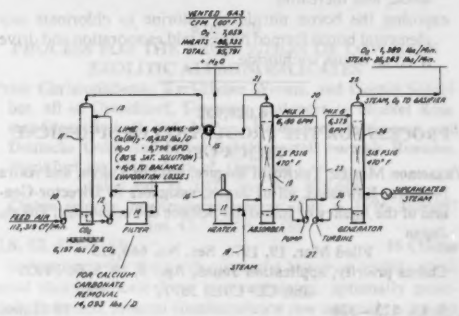


1. A method for making a polycrystalline optical body from a pressable or extrudable powder of an ionic fluoride comprising contacting a porous gas-permeable mass of said powder in a cavity with a reducing gas at a temperature in excess of about 500° C but below the melting point of said powder, to prevent backflow of air into said cavity prior to compaction of said powder, and, optionally, with hydrogen fluoride gas at a temperature in excess of about 300° C but below the melting point of said powder, for a sufficient period of time to effect a predetermined reduction of an impurity selected from the group consisting of free water, carbon dioxide, hydroxyl ion and acid fluorides, and either hot-pressing or extruding said powder at a temperature in the range from about 300° to about 800° C, and pressure sufficient to form an optical body characterized by having less than about 1 percent per millimeter absorption due to absorption bands in the transmission spectra within a wavelength in the range from about 1 μ to about 7 μ wherein said absorption is due to at least one impurity selected from the group consisting of carbon dioxide, water, hydroxyl ion and acid fluorides.

4,089,938
PROCESS FOR RECOVERING OXYGEN FROM AIR

Nelson C. Turner, Houston, Tex., assignor to Hudson Engineering Corporation, Houston, Tex.

Filed Jul. 15, 1977, Ser. No. 815,983
Int. Cl.[2] C01B 13/08
U.S. Cl. 423—579 4 Claims



1. A process for producing a mixture consisting essentially of oxygen and steam comprising the steps of: contacting in an absorbing zone, a suspension of manganese dioxide in an aqueous solution of sodium or potassium hydroxide with air at a pressure not substantially exceeding atmospheric and at a temperature within the range of 400° to 550° F to provide an oxygen enriched stream; pumping said oxygen enriched stream into a generating zone maintained at a pressure within the range of 150 to 1035 psig and at a temperature within the range of 350° to 550° F, contacting said oxygen enriched stream while in said generating zone with steam to provide an oxygen depleted stream, said steam being sufficiently superheated to avoid substantially any condensation thereof in said generating zone; flowing said oxygen depleted stream back into said absorbing zone, and flowing a stream consisting essentially of oxygen and steam from said generating zone.

4,089,939
PROCESS FOR THE PRODUCTION OF HYDROGEN FROM WATER

John H. Norman; John L. Russell, Jr., both of La Jolla, and Susan A. Stowell, San Diego, all of Calif., assignors to General Atomic Company, San Diego, Calif.

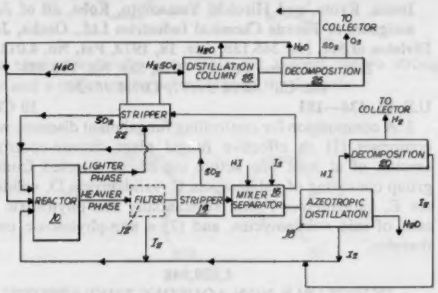
Filed Feb. 25, 1977, Ser. No. 772,308
Int. Cl.[2] C01B 1/02, 7/18, 17/74
U.S. Cl. 423—648 R 13 Claims

1. In a process for the production of hydrogen from water which process includes the steps of

1. making hydrogen iodide and sulfuric acid by the reaction of I_2, SO_2 and H_2O, said reaction being carried out with SO_2 present in a substantial molar excess with respect to the available H_2O and with I_2 also present in an excess so as to cause the formation of a lighter sulfuric acid-bearing phase and a heavier hyrogen iodide-bearing phase, containing residual sulfuric acid, which phases are distinct from each other.
2. separating said heavier phase from said lighter phase,
3. degassing said heavier phase to remove essentially all of the unreacted SO_2 therein and
4. treating said heavier phase so as to separate said hydrogen iodide and cuase the decomposition thereof to form hydrogen,

wherein the improvement comprises

promptly adding HI and I_2 to said degassed portion to cause the formation of a light immiscible fraction containing an



aqueous solution of sulfuric acid and removing said light immiscible fraction to thereby substantially reduce the sulfur content of said degassed heavier phase.

4,089,940

PROCESS FOR THE THERMOCHEMICAL PRODUCTION OF HYDROGEN

John H. Norman; John L. Russell, Jr., both of La Jolla; John T. Porter, II; Kenneth H. McCorkle, both of Del Mar; Thomas S. Roemer, Cardiff, and Robert Sharp, Del Mar, all of Calif., assignors to General Atomic Company, San Diego, Calif.

Continuation-in-part of Ser. No. 601,917, Aug. 4, 1975, abandoned. This application Apr. 8, 1977, Ser. No. 786,009

Int. Cl.[2] C01B *1/02, 7/18, 7/14, 7/14, 17/74*

U.S. Cl. 423—648 R **15 Claims**

1. A process for the thermochemical production of hydrogen from water, which process comprises the steps of making hydrogen iodide and H_2SO_4 by the reaction of iodine, sulfur dioxide and water, said reaction being carried out with sulfur dioxide and iodine present in stoichiometric excess with respect to the reacting water and at a temperature above about −60° C. to cause two distinct aqueous phases to be formed, a lighter sulfuric acid-bearing phase and a heavier hydrogen iodidebearing phase, said lighter phase containing most of said H_2SO_4 which is produced and said heavier phase containing most of said hydrogen iodide which is produced, separating said heavier phase from said lighter phase, treating said hydrogen iodide from said heavier phase to cause the decomposition thereof and recovering hydrogen and iodine.

4,089,941

STEAM REFORMER PROCESS FOR THE PRODUCTION OF HYDROGEN

Bernard Villemin, Toulouse, France, assignor to A.P.C. (Azote et Produits Chimiques) Catalysts & Chemicals Europe Societe, Paris, France

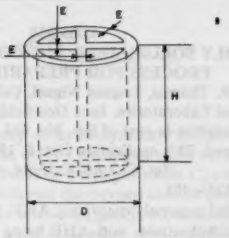
Filed Oct. 19, 1976, Ser. No. 734,014

Claims priority, application France, Oct. 22, 1975, 75 32280

Int. Cl.[2] C01B *1/18*

U.S. Cl. 423—654 **8 Claims**

1. In a catalytic steam reformer process comprising reacting in a steam-reforming furnace at 500°–1000° C. a gaseous hydrocarbon with steam at a steam/carbon ratio of 2 to 5, to form hydrogen, the improvement wherein the reaction is conducted in contact with an impregnated nickel catalyst comprising a support containing at least 98% of alumina, having the shape of a cylinder containing at least four partitions located in radial planes and in which the porosity ranges between 0.08 and 0.20 cm^3/g, and 4 to 15% of nickel calculated as NiO with respect



to the total weight of the catalyst, deposited by impregnation on the support.

4,089,942

DEODORANT COMPOSITION AND PROCESS

Pierre Boré, Montfermeil; Jean-Claude Arnaud, and Arnaud de Labbey, both of Paris, all of France, assignors to L'Oreal, Paris, France

Filed Jan. 25, 1977, Ser. No. 762,330

Claims priority, application Luxembourg, Jan. 29, 1976, 74266

Int. Cl.[2] A61K *7/32*

U.S. Cl. 424—47 **16 Claims**

1. A deodorant composition for body hygiene to prevent the formation of unpleasant odors due to bacterial decomposition of perspiration, comprising a cosmetic carrier and essentially as the active component in said composition a mixture of at least one weak organic acid and at least one salt of a weak organic acid and an aminated organic compound, said weak organic acid having the formula $C_nH_m(OH)_x(COOH)_y$ wherein n is 0 or a whole number from 1 to 6, m is a whole number from 1 to 8, x is 0, 1 or 2 and y is 1, 2 or 3 and having a molecular weight not exceeding 192, the said mixture on application to the selected areas of the body maintains the pH of the perspiration at a value approximately fixed between about 3 to 6.

4,089,943

TOOTHPASTE FORMULATIONS

Francis D. Roberts, Millinton, N.J., and John J. Steinke, III, Syracuse, N.Y., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 440,945, Feb. 8, 1974, Pat. No. 3,935,306, which is a continuation of Ser. No. 243,060, Apr. 11, 1972, abandoned, which is a continuation-in-part of Ser. No. 147,613, May 27, 1971, abandoned, which is a continuation of Ser. No. 749,934, Sep. 5, 1968, abandoned. This application Jan. 6, 1976, Ser. No. 646,680

The portion of the term of this patent subsequent to Apr. 13, 1988, has been disclaimed.

Int. Cl.[2] A61K *7/16*

U.S. Cl. 424—49 **22 Claims**

1. A toothpaste containing individually visible palpable particles of substantially water-insoluble agglomerated material consisting essentially of individually invisible, impalpable water-insoluble agglomerated powder particles of dental polishing agent, said powder particles being so agglomerated that said visible palpable particles retain their visibility and palpability in the toothpaste but are mechanically reduced to impalpability when the toothpaste is rubbed on the teeth during brushing with a toothbrush, said palpable particles being dispersed in a translucent or transparent gel, the amount of said palpable particles being such that said toothpaste when viewed with the naked eye has the visual effect of having said palpable particles distributed therein, and contrasting visibly with respect to the transparent or translucent balance of the tooth-

paste, the content of dental polishing agent in said toothpaste being sufficient to provide a dental polishing action on use of said toothpaste.

4,089,944

RAPIDLY SOLUBILIZED AHF COMPOSITION AND PROCESS FOR PREPARING SAME

William R. Thomas, Laguna Niguel, Calif., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation-in-part of Ser. No. 643,178, Dec. 22, 1975, abandoned. This application Oct. 5, 1976, Ser. No. 729,758

Int. Cl.[2] A61K *35/14, 47/00*

U.S. Cl. 424—101 **36 Claims**

1. A solid material comprising AHF, fibrinogen and a water soluble carbohydrate, said AHF being present in an amount sufficient to provide a therapeutically useful solution of AHF upon reconstitution in aqueous media and said carbohydrate being present in an amount sufficient to provide in said solution a carbohydrate concentration of at least about 2 grams per 100 milliliters.

4,089,945

ANTIDANDRUFF SHAMPOOS CONTAINING METALLIC CATION COMPLEX TO REDUCE IN-USE SULFIDE ODOR

Richard Edward Brinkman, Montgomery, and Robert Loren Vogenthaler, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 591,978, Jun. 30, 1975, abandoned. This application Jan. 6, 1977, Ser. No. 757,190

Int. Cl.[2] A61K *33/04*

U.S. Cl. 424—164 **10 Claims**

1. A shampoo composition comprising in an aqueous carrier:

(A) from about 10% to about 50% of a surfactant;

(B) from about 1% to about 15% of an antidandruff agent selected from the group consisting of elemental sulfur and selenium sulfide; and

(C) from about 0.1% to about 1% of a complex of a metallic cation wherein the metal is selected from the group consisting of arsenic, mercury, copper, tin, bismuth, antimony, cadmium, lead, silver and gold and the complexing agent is selected from the group consisting of amino-N-polycarboxylic acids, amino-N-carboxylic acids, polyamino-N-carboxylic acids, polycarboxylic acids, polyhydric monocarboxylic acids and polyamines.

4,089,946

CLAUDOGENIC-INTERCEPTIVE NONAPEPTIDES

Theodore J. Foell, King of Prussia, and Richard W. Rees, Bryn Mawr, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Jun. 7, 1976, Ser. No. 693,679

Int. Cl.[2] C07C *103/52;* **A61K** *37/00*

U.S. Cl. 424—177 **4 Claims**

1. The compound of the formula:

L-p-Glu-L-His-L-Trp-L-Ser-L-Tyr-D-Trp-L-(N-methyl)Leu-L-Arg-L-Pro-NHC_2H_5

or a non-toxic acid addition salt thereof.

2. A method for terminating pregnancy in a female mammal which comprises administering a nonapeptide of the formula:

L-p-Glu-L-His-L-Trp-Ser-L-Tyr-D-Trp-L-(N-methyl)Leu-L-Arg-L-Pro-NHC_2H_5,

or a pharmaceutically acceptable acid addition salt thereof, to said mammal, post coitally, in a daily regimen containing at least about 3 micrograms per kilogram host body weight for a time sufficient to terminate pregnancy.

4,089,947

ANTIBIOTIC COMPOSITIONS CONTAINING VALIDAMYCIN COMPOUNDS

Satoshi Horii, Sakai; Yukihiko Kameda, Kanazawa; Takashi Iwasa, Kyoto, and Hiroichi Yamamoto, Kobe, all of Japan, assignors to Takeda Chemical Industries Ltd., Osaka, Japan

Division of Ser. No. 245,135, Apr. 18, 1972, Pat. No. 4,011,391. This application Jul. 30, 1976, Ser. No. 710,238

Int. Cl.[2] A61K *31/71;* **C07H** *15/20*

U.S. Cl. 424—181 **10 Claims**

1. A composition for controlling fungal plant diseases, which comprises (1) an effective fungal plant disease-controlling amount of at least one active ingredient selected from the group consisting of validamycin C, validamycin D, validamycin E, validamycin F and substantially non-phytotoxic acid salts of said validamycins, and (2) a non-phytotoxic carrier therefor.

4,089,948

INJECTABLE NON-AQUEOUS THERAPEUTIC COMPOSITIONS

Karl Rumpf, 3006 Grossburgwedel, Entenfang, 22, Germany

Continuation of Ser. No. 508,562, Sep. 23, 1974, abandoned. This application Apr. 16, 1976, Ser. No. 677,800

Claims priority, application United Kingdom, Sep. 24, 1973, 44680/73

Int. Cl.[2] A61K *31/505, 31/625*

U.S. Cl. 424—229 **8 Claims**

1. An injectable non-aqueous one-phase formulation for treating bacterial infections in animals and humans which comprises from 10 to 50% w/v of a potentiated composition consisting of sulphadimidine and sulphathiazole in a ratio of from 1:3 to 3:1, and trimethoprim in a ratio to the combined sulpha-component of from 3.5:1 to 7:1 the composition being dissolved in *N,N*-dimethylacetamide.

4,089,949

INJECTABLE THERAPEUTIC COMPOSITIONS

Karl Rumpf, 3006 Grossburgwedel, Entenfang 22, Germany

Continuation of Ser. No. 508,574, Sep. 23, 1974, abandoned. This application Apr. 16, 1976, Ser. No. 677,801

Claims priority, application United Kingdom, Sep. 24, 1973, 44679/73

Int. Cl.[2] A61K *31/505, 31/625*

U.S. Cl. 424—229 **7 Claims**

1. An injectable aqueous one-phase formulation for treating bacterial infections in animals and humans, which comprises x% w/v of a potentiated composition consisting of sulphadimidine, sulphathiazole and trimethoprim dissolved in aqueous N,N-dimethylacetamide, wherein the *x*% w/v concentration of the composition is from 10 to 50% w/v, the ratio of sulphadimidine to sulphathiazole is from 3:1 to 1:3, the ratio of the sulphonamide together to trimethoprim is from 3.5:1 to 7:1, and the water content of the N,N-dimethylacetamide is less than $(50-x)\%$ v/v and at least $0.3 \times (50-x)\%$ v/v.

5. A method of treating bacterial infections in animals and humans having a bacterial infection comprising the intramuscular or intravenous administration to said animal or human of an effective antibacterial dosage of a formulation, as defined in claim 1.

4,089,950

ANTIBACTERIAL COMPOSITIONS

Erika Bohni, and Marc Montavon, both of Basel, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

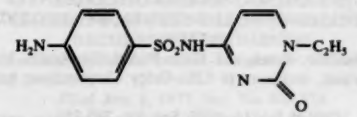
Division of Ser. No. 676,581, Apr. 13, 1976, Pat. No. 4,039,667, which is a division of Ser. No. 529,179, Dec. 3, 1974, Pat. No. 3,996,357. This application May 6, 1977, Ser. No. 794,422

Claims priority, application Switzerland, Dec. 12, 1973, 17400/73

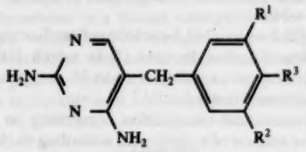
Int. Cl.[2] A61K *31/625, 31/505*

U.S. Cl. 424—229 **4 Claims**

1. An antibacterial composition comprising the sulfonamide of the formula



or a pharmaceutically acceptable salt thereof with a strong base and a sulfonamide potentiator of the formula



wherein R^1 and R^2 are lower alkoxy and R^3 is (lower alkyl)-amino or di(lower alkyl)amino, or a pharmaceutically acceptable acid addition salt thereof, wherein the weight ratio of sulfonamide to sulfonamide potentiator is in the range of from 1:1 to 40:1.

4,089,951

OESTRUS OR MENSTRUAL REGULATION

Barrington John Albert Furr, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Mar. 14, 1977, Ser. No. 777,423

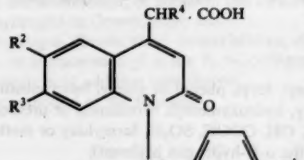
Claims priority, application United Kingdom, Apr. 14, 1976, 15249/76

Int. Cl.[2] A61K *31/625, 31/215, 31/19*

U.S. Cl. 424—232 **6 Claims**

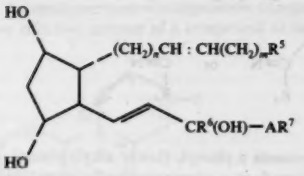
1. A method of returning cycling female mammals to the beginning of a new menstrual or oestrus cycle, during the period at the beginning of the cycle when the corpus luteum is not susceptible to the action of a luteolytic prostaglandin which comprises administering to said animals an effective amount of a known prostaglandin synthetase inhibitor and a known luteolytic prostaglandin.

3. The method of claim 1 wherein the prostaglandin synthetase inhibitor is aspirin, indomethacin, phenylbutazone, mefenamic acid, flufenamic acid, ibuprofen, flurbiprofen, meclofenac, alclofenac, ketoprofen, naproxen, voltaren, tolmetin, nifluril, flufenisal, sudoxicam, isoxicam, proquazone or a quinolone alkanoic acid derivative of the formula:



wherein R^1 is a hydrogen or chlorine atom or a methyl, ethyl or trifluoromethyl radical, and R^2, R^3, and R^4 are each a hydrogen atom or a methyl radical.

4. The method of claim 1 wherein the luteolytic prostaglandin is prostaglandin $F_2\alpha$,ω-bis-homo-prostaglandin $F_2\alpha$, 9α,-11α,15-trihydroxy-15-methylprosta-4,5,13-trans-trienoic acid, 15-methyl-prostaglandin $F_2\alpha$, 16,16-dimethyl-prostaglandin $F_2\alpha$, 17-phenyl-ω-tetranor-prostaglandin $F_2\alpha$, or a prostaglandin analogue of the formula:



II

wherein R^5 is a carboxy or hydroxymethyl radical or a C_{2-11} alkoxycarbonyl radical, R^6 is a hydrogen atom or a C_{1-4}-alkyl radical, A is a direct bond or a straight chain C_{1-3}-alkylene or alkyleneoxy radical, wherein the oxygen atom is bonded to R^7, optionally bearing one or two C_{1-4}-alkyl substituents, *n is* 1 or 2 and *m* is 2 or 3, and *n* and *m* together are 4, and R^7 is a phenyl or naphthyl radical optionally bearing one or two substituents selected from halogen atoms, nitro radicals and C_{1-5}-alkyl, alkoxy and halogenoalkyl radicals, or a prostaglandin analogue of the formula II wherein R^5, R^6 and A have the meanings given above, *n* is 1, *m* is 3, and R^7 is a thiazolyl, indolyl, benzimidazolyl, benzothiazolyl, pyridyl, pyrimidinyl, quinolyl, indolinyl, pyridazinyl, benzo [b] furanyl or benzo [b] thienyl radical optionally substituted by 1 to 4 substituents selected from halogen atoms and C_{1-3}-alkyl and alkoxy radicals.

4,089,952

NEUROPSYCHOTROPIC AGENTS AND THEIR USE

Turan M. Itil, Nyack, N.Y.; Gerhard Laudahn, and Werner Martin Herrmann, both of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed Sep. 30, 1976, Ser. No. 728,145

Claims priority, application Germany, Sep. 30, 1975, 2544061

Int. Cl.[2] A61K *31/56*

U.S. Cl. 424—243 **6 Claims**

1. A method for the treatment of psychic disturbances of the affective and behavioral type in humans, which comprises administering to a male patient manifesting such psychic disturbance an amount of DL-13-ethyl-17α-ethynyl-17β-hydroxy-4-gonen-3-one, or of the D-isomer only or of the L-isomer only, or a physiologically acceptable 17-ester thereof of a hydrocarbon carboxylic acid of 1 - 18 carbon atoms, effective to beneficially affect the symptomology associated with the psychic disturbance.

4,089,953

1,5-BENZODIAZOCINES

Umakant Devdas Shenoy, London, England, assignor to DDSA Pharmaceuticals, London, England

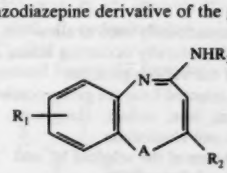
Continuation-in-part of Ser. No. 487,480, Jul. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 480,918, Jun. 19, 1974, abandoned. This application Oct. 15, 1975, Ser. No. 622,543

Claims priority, application United Kingdom, Jun. 20, 1973, 29274/73

Int. Cl.[2] A61K *31/44, 31/395;* **C07D** *245/06, 401/04*

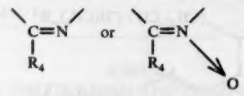
U.S. Cl. 424—244 **13 Claims**

1. A 1,5-Benzodiazepine derivative of the general formula



wherein R_1 represents chlorine, a trifluoromethyl, cyano or nitro all in the 8 position; R_2 represents a hydrogen atom or a lower alkyl group; R_3 represents a hydrogen atom, a lower alkyl group, a hydroxy group, a lower alkenyl group or a benzyl group;

and A represents a grouping of the general formula



in which R_4 represents a phenyl, (lower alkyl) phenyl, nitrophenyl or halophenyl; or a pharmaceutically acceptable acid addition salt thereof.

13. A tranquilizing, sedative or hypnosis-inducing composition comprising a tranquilizing, sedative, or hypnosis-inducing amount of at least one compound according to claim 1 in admixture with a pharmacologically acceptable diluent or carrier.

4,089,954

METAL SALTS OF FATTY ACID DERIVATIVES OF AMINO ACIDS

Jean V. Morelle, and Eliane M.-T Lauzanne-Morelle, both of 170 avenue Parmentier, Paris 75010, France

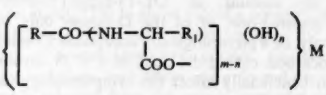
Filed Oct. 14, 1975, Ser. No. 621,954

Claims priority, application France, Oct. 28, 1974, 74 35929

Int. Cl.² A61K *31/555, 31/195;* **C07F** *17/00*

U.S. Cl. 424—245 **2 Claims**

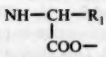
1. A compound of the formula



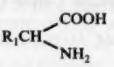
wherein:

(a) R—CO is the acyl moiety of a straight fatty acid RCOOH comprising from 6 to 20 carbon atoms;

(b)



represents the skeleton of the amino acid



in which R_1 is conventionally used to allow the generic designation of any of the naturally occurring amino acids obtained by degradation of the various proteins;

(c) M is a metal selected from the group consisting of magnesium, calcium, iron, cobalt, manganese, copper, zinc, molybdenum and aluminium;

(d) *m* is the valency of the selected M; and

(e) *n* is an integer inferior to *m*.

2. A therapeutic composition for the treatment of deficiencies in metal in living organisms, said therapeutic composition comprising a carrier and an effective amount of an active ingredient which is at least one compound selected from those of claim 1.

4,089,955

7-β-[D-2-AMINO-2-(1,4-CYCLOHEXADIENYL)-ACETYLAMINO]-3-HAL-3-CEPHEM-4-CARBOXYLIC ACIDS

Peter Schneider, Basel, and Hans Bickel, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 14, 1976, Ser. No. 705,221

Claims priority, application Switzerland, Jul. 31, 1975, 10001/75

Int. Cl.² C07D *501/20;* **A61K** *31/545*

U.S. Cl. 424—246 **4 Claims**

1. A 7β-[D-2-amino-2-(1,4-cyclohexadienyl)-acetylamino]-3-Hal-3-cephem-4-carboxylic acid (I) in which Hal denotes halogen with an atomic number of up to 35, or a pharmaceutically acceptable salt thereof.

3. A pharmaceutical composition comprising an antibiotically effective amount of a compound according to claim 1 and a pharmaceutical carrier.

4,089,956

7-ACYLAMINO-8-OXO-3-OXA-1-AZABICYCLO[4.2.0]OCTANE-2-CARBOXYLIC ACID DERIVATIVES AND BACTERICIDAL COMPOSITIONS AND USE THEREOF

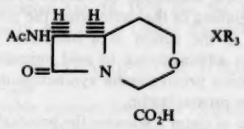
Thomas Francis Buckley, Albany, Calif., and John Gerald Gleason, Delran, N.J., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Sep. 8, 1976, Ser. No. 721,251

Int. Cl.² A01N *9/00, 9/22;* **C07D** *265/00, 273/00*

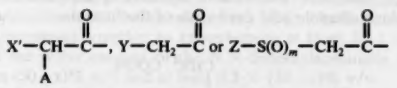
U.S. Cl. 424—248.53 **14 Claims**

1. A compound of the formula:



in which:

Ac is:



wherein:

X′ is thienyl, furyl, phenyl or phenyl monosubstituted with hydroxy, hydroxymethyl, formamido or ureido;

A is NH_2, OH, COOH, SO_3H, formyloxy or methoxyimino (when the α-C-hydrogen is absent);

Y is cyano, syndnone, pyridone, thienyl, phenoxy, phenyl or tetrazolyl;

Z is methyl, trifluoromethyl, trifluoroethyl, pyridyl or cyanomethyl; and *m* is 0 to 2;

X is thio or oxy; and

R_3 is a saturated or unsaturated, substituted or unsubstituted lower alkyl of from 1–4 carbon atoms; or a sodium or potassium salt of said compound.

11. A pharmaceutical composition for oral or parenteral administration and having antibacterial activity comprising a nontoxic, antibacterially effective amount of the compound of claim 1 and a pharmaceutically acceptable carrier therefor.

4,089,957

THERAPEUTIC COMPOSITIONS AGAINST RECURRENT THROMBOSIS

Nils Åke Jönsson, Solna, Sweden, assignor to AB Kabi, Stockholm, Sweden

Filed Jun. 6, 1977, Ser. No. 803,876
Claims priority, application Sweden, Jun. 11, 1976, 7606632
Int. Cl.[2] A61K *31/535*
U.S. Cl. 424—248.56 **8 Claims**

1. The method of resisting as well as suppressing recurrent venous thrombosis in a human susceptible to or having said thrombosis, which method comprises administering to said human a recurrent venous thrombosis-combatting effective dose of a pharmaceutical composition comprising a pharmaceutically acceptable acid addition salt of moroxydine.

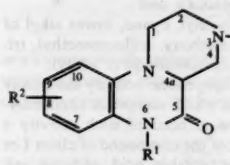
4,089,958

2,3,4,4a-TETRAHYDRO-1H-PYRAZINO[1,2-a]QUINOXALIN-5(6)-ONES AND DERIVATIVES THEREOF

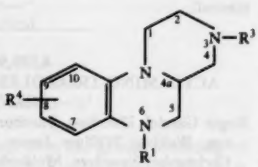
Meier E. Freed, Paoli, and John R. Potoski, Spring City, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,577
Int. Cl.[2] C07D *487/04, 241/04;* A61K *31/495*
U.S. Cl. 424—250 **48 Claims**

1. A compound of the formula:



or



wherein

R is hydrogen, (lower)alkyl, phen(lower)alkyl, benzoyl(lower)alkyl, or p-halobenzoyl(lower)alkyl;

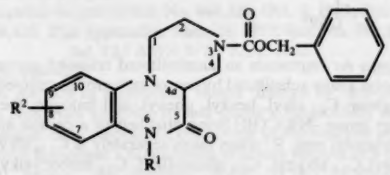
R^1 is hydrogen or (lower)alkyl;

R^2 is hydrogen, (lower)alkyl, (lower)alkoxy, chlorine, fluorine, trifluoromethyl, or amino in the 7-, 8-, or 9-position;

R^3 is hydrogen or (lower)alkyl; and

R^4 is hydrogen, (lower)alkyl, (lower)alkoxy, chlorine, fluorine, or trifluoromethyl in the 7-, 8-, or 9-position; or the non-toxic acid addition salts thereof.

29. A compound of the formula:

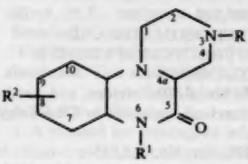


wherein:

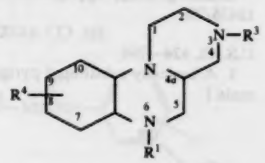
R^1 is hydrogen or (lower)alkyl

R^2 is hydrogen, (lower)alkyl, (lower)alkoxy, chlorine, fluorine, trifluoromethyl, amino, or trifluoroacetamido in the 7-, 8-, or 9-position.

42. An antihypertensive composition comprising (a) a hypotensive effective amount of a compound of the formula:



or



wherein

R is hydrogen, (lower)alkyl, phen(lower)alkyl, benzoyl(lower)alkyl, or p-halobenzoyl(lower)alkyl;

R^1 is hydrogen or (lower)alkyl;

R^2 is hydrogen (lower)alkyl, (lower)alkoxy, chlorine, fluorine, trifluoromethyl, or amino in the 7-, 8-, or 9-position;

R^3 is hydrogen or (lower)alkyl; and

R^4 is hydrogen, (lower)alkyl, (lower)alkoxy, chlorine, fluorine, or trifluoromethyl in the 7-,8-, or 9-position; or the non-toxic acid addition salts thereof; and (b) a pharmaceutically acceptable carrier;

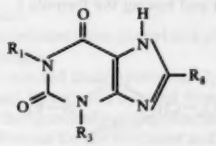
4,089,959

LONG-ACTING XANTHINE BRONCHODILATORS AND ANTIALLERGY AGENTS

Julius Diamond, Morris Plains, N.J., assignor to Cooper Laboratories, Inc., Parsippany, N.J.

Filed Mar. 31, 1976, Ser. No. 672,437
Int. Cl.[2] A61K *31/52;* C07D *473/06*
U.S. Cl. 424—253 **39 Claims**

1. A method for producing prolonged bronchodilation and prolonged inhibition of allergic mediator release in mammals by administering to a mammal in need thereof an effective amount of a compound having the formula:



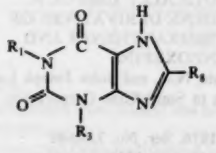
wherein:

R_1 = methyl

R_3 = C_4–C_7 alkyl, C_4–C_7 alkenyl, C_4–C_7 alkynyl, C_4–C_7 cycloalkyl, C_4–C_7 cycloalkylalkyl

R_8 = C_1–C_2 alkyl.

18. A compound having the formula:



wherein:

R_1 = methyl

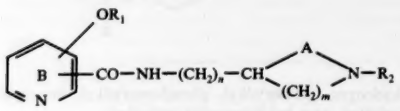
R_3 = CH_2—(C_3-C_4 alkyl), —CH_2—(C_3-C_4 cycloalkyl),
R_4 = C_1-C_2 alkyl.

4,089,960
ANTIEMETIC, PSYCHOSOMATIC AND ANTIPSYCHOTIC HETEROCYCLIC PYRIDINE CARBOXAMIDES

Jacques Gosteli, Basel; Angelo Storni, Rheinfelden, and Armin Zust, Birsfelden, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sep. 14, 1976, Ser. No. 723,125
Claims priority, application Switzerland, Sep. 25, 1975, 12435/75
Int. Cl.[2] A61K *31/455*
U.S. Cl. 424—266 **21 Claims**

1. A basically substituted pyridine carboxamide of the formula I



(I)

wherein

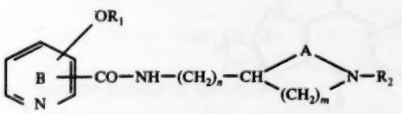
R_1 represents lower alkyl and —OR_1 is in the adjacent position to the carboxamide group,

R_2 represents lower alkyl or an ethylene radical which is attached to one of the trivalent radicals designated as A and the nitrogen atom located between it to form a 6-membered ring,

A represents a divalent saturated aliphatic hydrocarbon radical which contains not more than 7 carbon atoms and whose two linkage positions are separated by (3-*m*) to 4 carbon atoms, or, if R_2 is an ethylene radical, represents the 1-propanyl-3-ylidene radical, if *m* is 1, or the 1,2,4-butane-triyl radical, if *m* is 0,

and one of the factors *m* and *n* is 0 and other is 1, and the ring B is substituted only by O—R_1 or additionally by halogen with an atomic number up to 35, by lower alkyl, lower alkoxy, lower alkylthio, lower alkylsulphinyl, lower alkylsulphonyl, di-lower alkylamino or cyano, and the acid addition salts thereof.

17. A method for the treatment of a state of psychomotor excitation in a warmblooded animal comprising administration to said animal of a therapeutically effective amount of a compound according to claim 1 and having the formula I



(I)

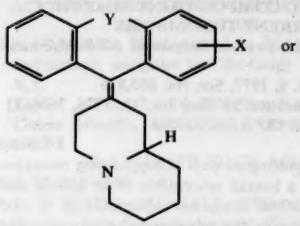
in which R_1, R_2, A, *m* and *n* are as defined in claim 1 and, the ring B is substituted only by O—R_1 or additionally as defined in claim 1, or of a pharmaceutically effective acid addition salt thereof.

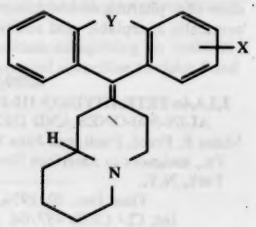
4,089,961
ANTIPSYCHOTICALLY USEFUL QUINOLIZIDYLIDENE DERIVATIVES OF XANTHENES, THIOXANTHENES AND DIBENZOXEPINS

Carl Kaiser, Haddon Heights, N.J., and John Joseph Lafferty, Levittown, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Nov. 8, 1976, Ser. No. 739,688
Int. Cl.[2] C07D *405/04*; A61K *31/445*
U.S. Cl. 424—267 **10 Claims**

1. A chemical compound of the formula:





or a pharmaceutically acceptable acid addition salt thereof in which:

Y is oxygen, sulfur or methyleneoxy; and

X is hydrogen, halogen, thiomethyl, cyano, lower alkyl of from 1 to 3 carbon atoms, methoxy, trifluoromethyl, trifluoromethylthio, dimethylaminosulfonyl or acetyl.

8. A method of producing antipsychotic activity essentially free of extrapyramidal symptoms which comprises administering internally to an animal host in need of such activity a therapeutically effective amount of the compound of claim 1 or a nontoxic pharmaceutically acceptable acid addition salt thereof.

4,089,962
ACYLAMINO TRIAZOLES AS ANTIASTHMATIC AGENTS

Roger Garrick Harrison, Farnborough; William Boffey Jamieson, Woking; William James Ross, Lightwater, and John Christopher Saunders, Maidenhead, all of England, assignors to Lilly Industries Limited, Henrietta Place, England

Filed Jun. 1, 1976, Ser. No. 691,963
Claims priority, application United Kingdom, Jun. 5, 1975, 24221/75
Int. Cl.[2] A61K *31/41*
U.S. Cl. 424—269 **4 Claims**

1. An anti-asthma treatment method which comprises administering to a mammal suffering from an asthmatic condition and in need of treatment, an amount of a compound of the following formula effective to alleviate said asthmatic condition:

wherein Ar represents an unsubstituted triazolyl group or a triazolyl group substituted by one or two groups selected from the group C_{1-4} alkyl, benzyl, phenyl, and halogen; the acylamino group -NR^1COR^2 being attached to a carbon atom of the triazolyl ring, R^1 when taken separately is C_{1-10} alkyl, C_{3-6} alkenyl C_{3-6} alkynyl, C_{2-6} alkoxyalkyl, C_{2-6} carboxyalkyl, C_{1-6} haloalkyl, C_{3-10} cycloalkyl, C_{3-10} cycloalkyl-C_{1-6} alkyl, phenyl-C_{1-6} alkyl, phenyl-C_{2-6} alkenyl, or substituted phenyl C_{1-6} alkyl and substituted phenyl-C_{2-6} alkenyl wherein said phenyl substituent can be halogen, trifluoromethyl, methyl, methoxy or nitro; and R^2 when taken separately is C_{1-8} alkyl, C_{1-6} haloalkyl, C_{2-6} alkenyl, C_{3-10} cycloalkyl, C_{3-10} cycloalkyl-C_{1-6} alkyl, C_{1-4}

alkoxycarbonyl-C_{1-8} alkyl, C_{2-8} carboxyalkyl, phenyl, phenyl-C_{1-6} alkyl, phenyl-C_{2-6} alkenyl, substituted phenyl, substituted phenyl-C_{1-6} alkyl or substituted phenyl-C_{2-6} alkenyl wherein the said substituent can be halogen, trifluoromethyl, methyl, methoxy or nitro or R^1 and R^2 together form a lactam ring having 5 to 7 ring atoms.

4,089,963

ESTERS OF AMIDINOPENICILLANIC ACIDS, PHARMACEUTICAL PREPARATIONS AND METHOD FOR TREATING INFECTIOUS DISEASES

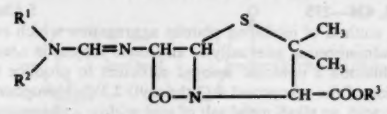
Peter Bamberg, Enhorna; Bertil Ake Ekstrom, and Berndt Olof Harald Sjoberg, both of Sodertalje, all of Sweden, assignors to Astra Pharmaceutical Products, Inc., Framingham, Mass.

Continuation-in-part of Ser. No. 340,674, Mar. 13, 1973, abandoned. This application Jun. 10, 1975, Ser. No. 585,757

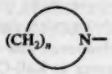
Int. Cl.² A61K *31/43;* **C07D** *499/02, 499/32*

U.S. Cl. 424—270 **22 Claims**

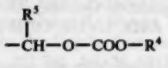
1. A compound of the structural formula



or a therapeutically acceptable salt thereof, wherein R^1 and R^2, together with the adjacent nitrogen atom, form a heterocyclic ring structure having the formula



wherein *n* is 3–6, R^3 is the radical



in which radical R^4 is selected from the group consisting of alkyl groups containing from 1 to 8 carbon atoms, and R^5 is hydrogen or methyl.

4,089,964

METHOD OF CONTROLLING FUNGAL DISEASES IN PLANTS AND COMPOSITIONS EFFECTIVE THEREFOR

Hironari Sugiyama; Isao Chiyomaru; Itsuki Okuda, all of Shimizu; Hisaaki Yamamoto, Funabashi, and Hideo Ito, Onomichi, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 864,224, Oct. 6, 1969, Pat. No. 4,059,635. This application Mar. 28, 1977, Ser. No. 782,267

Int. Cl.² A01N *9/12, 9/14, 9/22*

U.S. Cl. 424—270 **3 Claims**

1. A method of controlling fungal diseases of rice plants which comprises applying to said plants a fungicidally effective amount of a composition containing an inert carrier and as the active ingredient a fungicidally effective amount of a compound having the formula $R—X—(CH_2)_n—CH{=}CCl_2$ wherein R is selected from the group consisting of alkyl having between one and twelve carbon atoms, phenyl, di-chlorophenyl, methyl-benzyl, phenethyl and benzothiazolyl; X is selected from the group consisting of sulfur, sulfinyl and sulfonyl; and *n* is an integer of 3,5 or 7.

4,089,965

THIAZOLYLPHENYLGUANIDINES AS ANTIRHINOVIRUS AGENTS

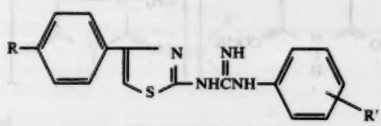
Robert Bruce Angier, and Harry Lee Lindsay, both of Pearl River, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 670,761, Mar. 26, 1976, abandoned. This application May 18, 1977, Ser. No. 798,201

Int. Cl.² A61K *31/425*

U.S. Cl. 424—270 **8 Claims**

1. A method for treating an infection caused by the growth of rhinovirus which comprises administering to man an antirhinoviral effective amount of a compound of the formula:



wherein R is selected from the group consisting of hydrogen and chloride; R' is selected from the group consisting of hydrogen, fluoride, chloride, lower alkyl, carboxyl and carboloweralkoxy or a pharmaceutically acceptable acid addition salt thereof.

4,089,966

5-N-(3-AMINO-2-HYDROXY-PROPYL)-AMINO-1,2,4-OXADIAZOLE DERIVATIVES, PROCESSES FOR THEIR PREPARATION AND APPLICATIONS THEREOF

Claude Cohen, Versailles, France, assignor to Aron Sarl, Suresnes, France

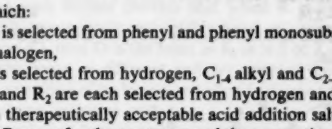
Filed Jun. 16, 1976, Ser. No. 696,722

Claims priority, application United Kingdom, Jun. 23, 1975, 26590/75

Int. Cl.² C07D *271/06;* **A61K** *31/42*

U.S. Cl. 424—272 **19 Claims**

1. A compound selected from a compound having the formula:



(I)

in which:

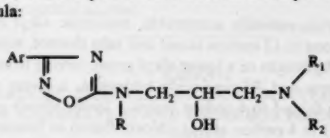
Ar is selected from phenyl and phenyl monosubstituted with halogen,

R is selected from hydrogen, C_{1-4} alkyl and C_{2-4} alkenyl,

R_1 and R_2 are each selected from hydrogen and C_{1-4} alkyl,

and a therapeutically acceptable acid addition salt thereof.

11. Process for the treatment and the prevention of disorders of the cardiac rhythm in Man, comprising administering to a patient in need thereof a therapeutic composition containing an amount, effective for correcting the disorders of the cardiac rhythm, of a compound selected from a compound having the formula:



(I)

in which:

Ar is selected from phenyl and phenyl monosubstituted with halogen,

R is selected from hydrogen, C_{1-4} alkyl and C_{2-4} alkenyl,

R_1 and R_2 are each selected from hydrogen and C_{1-4} alkyl, and a therapeutically acceptable acid addition salt thereof.

4,089,967

CREATININE PYRROLIDONE CARBOXYLATE, PHARMACEUTICAL COMPOSITIONS AND METHODS OF USE THEREOF

Dominique Bocher, 11, rue du Moulin Vert, 75014 Paris, France

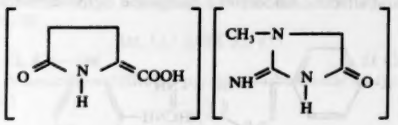
Filed Oct. 21, 1976, Ser. No. 734,628

Claims priority, application Luxembourg, Oct. 29, 1975, 73680

Int. Cl.[2] A61K *31/40, 31/415;* **C07D** *233/02*

U.S. Cl. 424—273 R **9 Claims**

1. Creatinine pyrrolidone carboxylate having the formula



4,089,968

STABLE SOLUTIONS OF IPRONIDAZOLE

Heinrich Klaui, Riehen, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 22, 1977, Ser. No. 779,977

Claims priority, application Austria, Apr. 5, 1976, 2434/76

Int. Cl.[2] A61K *31/415;* **C07D** *233/92*

U.S. Cl. 424—273 R **4 Claims**

1. A composition consisting essentially of a stable solution of ipronidazole in glycerinformal and water wherein each 100 parts by volume of said solution contains from about 5 parts by weight to about 15 parts by weight ipronidazole, from about 60 parts by volume to about 75 parts by volume glycerinformal and the remainder water.

4,089,969

5-AROYL-1,2-DIHYDRO-3H-PYRROLO[1,2-a]PYRROLE-1-CARBOXYLIC ACID DERIVATIVES AND PROCESS FOR THE PRODUCTION THEREOF

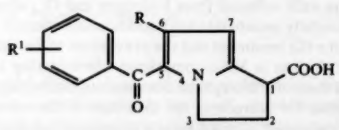
Joseph M. Muchowski, Mexico City, Mexico, and Arthur F. Kluge, Los Altos, Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 704,909, Jul. 14, 1976, abandoned. This application Feb. 23, 1977, Ser. No. 771,286

Int. Cl.[2] A61K *31/40;* **C07D** *209/00*

U.S. Cl. 424—274 **44 Claims**

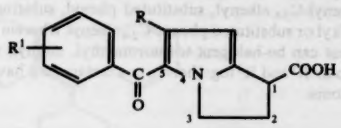
1. A compound selected from the group of those represented by the formula:



(A)

and the pharmaceutically acceptable, non-toxic alkyl esters having from one to 12 carbon atoms and salts thereof, wherein R represents hydrogen or a lower alkyl group having from 1 to 4 carbon atoms and R^1 represents hydrogen, a lower alkyl group having from 1 to 4 carbon atoms, a lower alkoxy group having from 1 to 4 carbon atoms, chloro, fluoro or bromo, the R^1 substitution being at the ortho, meta or para positions of the aroyl group.

38. A composition for treating inflammation, pain or pyrexia in mammals consisting essentially of a pharmaceutically acceptable non-toxic excipient and a therapeutically effective amount of the racemic mixture or the (l)-isomer of a compound represented by the formula:



(A)

and the pharmaceutically acceptable, non-toxic alkyl esters having from one to 12 carbon atoms and salts thereof, wherein R is hydrogen or a lower alkyl group having from 1 to 4 carbon atoms and R^1 represents hydrogen, a lower alkyl group having from 1 to 4 carbon atoms, a lower alkoxy group having from 1 to 4 carbon atoms, chloro, fluoro or bromo, the R^1 substitution being at the ortho, meta, or para positions of the aroyl group.

4,089,970

METHOD OF INHIBITING PLATELET AGGREGATION

Mirza M. A. Beg, Melrose Park, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Sep. 7, 1977, Ser. No. 831,322

Int. Cl.[2] A61K *31/38, 31/495*

U.S. Cl. 424—275 **5 Claims**

1. A method of inhibiting platelet aggregation which comprises administering internally to an animal subject in need of said inhibition a nontoxic amount sufficient to produce said inhibition of the compound 4-(2-thenoyl)-2,3-dichlorophenoxyacetic acid, an alkali metal salt of said acid or a pharmaceutically acceptable addition salt of said acid formed with a base.

4,089,971

PHARMACEUTICALLY ACTIVE 2,9-DIOXATRICYCLO[4,3,1,$0^{3,7}$]DECANES

Peter Willibrord Thies, Hannover, and Akiji Asai, Wennigsen, both of Germany, assignors to Kali-Chemie Pharma GmbH, Hannover, Germany

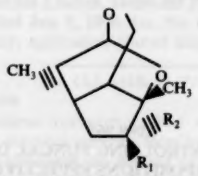
Filed Oct. 15, 1976, Ser. No. 732,791

Claims priority, application Germany, Oct. 22, 1975, 2547205

Int. Cl.[2] A61K *31/335;* **C07D** *319/08*

U.S. Cl. 424—278 **5 Claims**

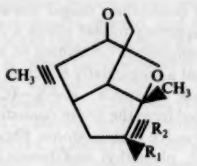
1. A compound selected from the group consisting of the 2,9-dioxatricyclo[4,3,1,$0^{3,7}$]decanes of the Formula I:



I

wherein one of R_1 and R_2 is hydrogen and the other is a hydroxy, carboxylic acyloxy or carbamyloxy or R_1 and R_2 taken together denote oxygen.

5. A pharmaceutical composition comprising a pharmaceutical carrier and an analgesic and anorectic effective amount of a compound selected from the group consisting of the following structural formula:



wherein one of R_1 and R_2 is hydrogen and the other is a hy-

droxy, carboxylic acyloxy or carbamyloxy or R_1 and R_2 taken together denote oxygen.

4,089,972

ORGANOTIN SULFINATES AS INSECTICIDES AND ACARICIDES

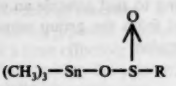
Richard John Strunk, Cheshire; Winchester Loomis Hubbard, Woodbridge, and Shih-Yu Ma, Cheshire, all of Conn., assignors to Uniroyal, Inc., New York, N.Y.

Filed May 28, 1976, Ser. No. 691,186

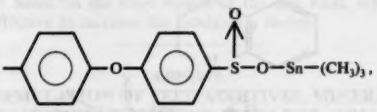
Int. Cl.[2] A01N *9/00*

U.S. Cl. 424—288 **18 Claims**

1. A method for controlling insect and acarid pests which comprises applying to said pests a pesticidally effective amount of an organotin compound having the formula



wherein R is 2-tetralin 41,



phenyl, substituted phenyl or substituted naphthyl wherein the substituents on the phenyl or naphthyl are selected from the group consisting of fluorine, chlorine, bromine, iodine, one to three linear or branched alkyls having 1 to 18 carbons atoms, cycloaklyl having 4 to 8 carbon atoms and phenyl.

4,089,973

CYANO PHENYLENE DIOXAMIC ACID COMPOUNDS USED IN THE TREATMENT OF ALLERGY

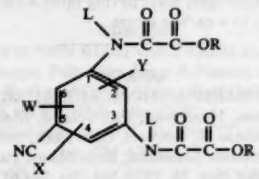
Charles M. Hall, and John B. Wright, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 382,762, Jul. 26, 1973, Pat. No. 3,993,679, which is a continuation-in-part of Ser. No. 317,005, Dec. 20, 1972, abandoned. This application Aug. 16, 1976, Ser. No. 714,569

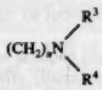
Int. Cl.[2] A61K *31/275*

U.S. Cl. 424—304 **21 Claims**

1. A compositon useful as an anti-asthma, anti-allergic rhinitis or anti-food allergic which comprises an effective amount of a compound of the formula



wherein R is selected from the group consisting of hydrogen, alkyl from one to six carbon atoms, inclusive, phenyl, a pharmacologically acceptable metal or amine cation, and

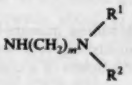


wherein n is 2 or 3, R^3 and R^4 are the same or different and are selected from the group consisting of hydrogen, alkyl of one to three carbon atoms, inclusive;

W, X, and Y can be the same or different and are selected from the group consisting of hydrogen, alkyl from one to six carbon atoms, inclusive, phenyl, alkoxy with the alkyl group having from one to six carbon atoms, inclusive, hydroxy, nitro, halogen, trifluoromethyl and

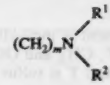
wherein Q is selected from the group consisting of

and

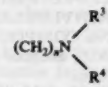


and a pharmaceutically acceptable metal or amine cation with the proviso that

where R is alkyl from one to six carbon atoms, inclusive, or phenyl, and Q is OD, then D is alkyl from one to six carbon atoms, inclusive, hydrogen,



or phenyl, and when R is



and Q is OD, then D is the same as R

and with further proviso that when R is hydrogen or a pharmaceutically acceptable metal or amine caton and Q is OD, then D is the same as R, m is 2 or 3, R^1 and R^2 are the same or different and are selected from the group consisting of hydrogen and alkyl from one to three carbon atoms, inclusive, and

L is selected from the group consisting of hydrogen, alkyl of from one to six carbon atoms, inclusive, benzyl, and monosubstituted benzyl wherein the subtituent is selected from the group consisting of alkyl from one to four carbon atoms, inclusive, and halogen; in association with a pharmaceutical carrier.

4,089,974

5-CARBOXY-PHENYLENEBIS(CARBONYLIMINO)BENZENE CARBOXYLIC AND DICARBOXYLIC ACIDS AND SALTS

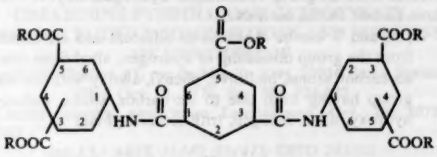
Ransom Brown Conrow, Pearl River; John Frank Poletto, Nanuet, and Seymour Bernstein, New City, all of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jun. 13, 1977, Ser. No. 805,775

Int. Cl.[2] A61K *31/19*; C07C *101/48*

U.S. Cl. 424—319 **11 Claims**

1. A compound of the formula:



wherein R is selected from the group consisting of hydrogen and alkali metal; and with the proviso that the terminal phenyls may only be di-substituted.

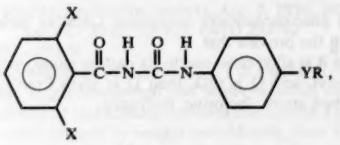
4,089,975

METHOD OF CONTROLLING MANURE-BREEDING INSECTS

Lisby Lucius Wade, and Muriel McDermott, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 13, 1977, Ser. No. 796,646
Int. Cl.[2] A01N *9/12, 9/20*
U.S. Cl. 424—322 **7 Claims**

1. A method of controlling manure-breeding insects which comprises orally administering to a warm-blooded animal an insecticidally-effective amount of a compound of the formula



wherein each X substituent is individually selected from the group consisting of Cl, F, CH_3, and OCH_3; R is a halogenated methyl or ethyl group; and Y is sulfur or oxygen.

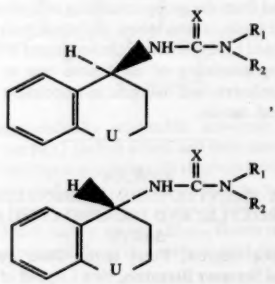
4,089,976

SYNTHESIS OF 1,2,3,4-TETRAHYDRO-4-OXO-[OR OXY-]-1-NAPHTHYLUREAS AS NOVEL GROWTH-PROMOTING COMPOUNDS FOR ANIMALS

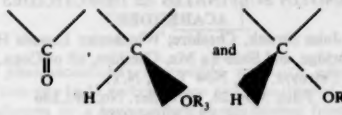
Goro Asato, Titusville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 670,330, Mar. 25, 1976, abandoned, which is a continuation-in-part of Ser. No. 582,559, May 30, 1975, abandoned. This application Aug. 12, 1976, Ser. No. 713,939
Int. Cl.[2] A61K *31/17;* **C07C** *127/19*
U.S. Cl. 424—322 **47 Claims**

1. A compound selected from the group consisting of the optical isomers of the formulae:

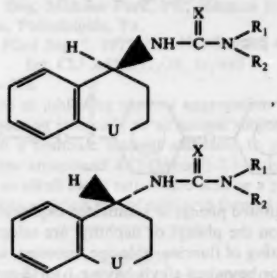


the racemic mixtures thereof and the cis and trans isomers thereof when U is not carbonyl wherein X is divalent oxygen or divalent sulfur; R_1 is selected from the group consisting of hydrogen and alkyl having up to 4 carbon atoms; R_2 is selected from the group consisting of hydrogen, allyl, 2-propynyl, alkoxy having up to 4 carbon atoms, benzyl and benzyloxy; and U is a divalent moiety selected from the group consisting of those of the formulae:

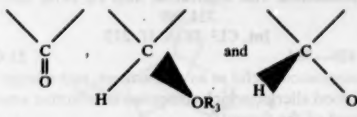


wherein R_3 is hydrogen, alkyl having up to 4 carbon atoms or acyl having up to 4 carbon atoms.

25. A method for improving the feed efficiency and enhancing the growth rate of veterinary homothermic animals comprising administering to said animals an effective amount of a compound selected from the group consisting of the optical isomers of the formulae:



the racemic mixtures thereof and the cis and trans isomers thereof when U is not carbonyl wherein X is divalent oxygen or divalent sulfur; R_1 is selected from the group consisting of hydrogen and alkyl having up to 4 carbon atoms; R_2 is selected from the group consisting of hydrogen, allyl, 2-propynyl, alkoxy having up to 4 carbon atoms, benzyl and benzyloxy; and U is a divalent moiety selected from the group consisting of those of the formulae:



wherein R_3 is hydrogen, alkyl having up to 4 carbon atoms or acyl having up to 4 carbon atoms.

4,089,977

POLYMERIC ANTI-MICROBIAL AGENT

Harold A. Green, Havertown, Pa.; John J. Merianos, Jersey City, and Alfonso N. Petrocci, Glen Rock, both of N.J., assignors to Kewanee Industries, Bryn Mawr, Pa.

Filed Nov. 24, 1976, Ser. No. 744,617
Int. Cl.[2] A01N *9/20;* **C07C** *87/22*
U.S. Cl. 424—329 **6 Claims**

1. A compound or a mixture of compounds formed by the reaction of equimolar proportions of 1,3-bis-dimethylamino-2-propanol and 1,3-dichloro-2-propanol, the reaction being effected at a temperature of about 40° to about 90° C for about 2 to 12 hours.

4. A method of inhibiting bacteria which comprises applying to said bacteria an antibacterially effective amount of a compound or mixture of compounds formed by the reaction of equimolar proportions of 1,3-bis-dimethylamino-2-propanol

and 1,3-dichloro-2-propanol, the reaction being effected at a temperature of about 40° to about 90° C for about 2 to 12 hours.

4,089,978

PET FOOD ACCEPTABILITY ENHANCER

Joaquin Castro Lugay, Thornwood, N.Y.; Gerhard Julius Haas, Woodcliff Lake, N.J., and Robert James Beale, New Rochelle, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Mar. 30, 1976, Ser. No. 671,783
Int. Cl.² A23K *1/04*
U.S. Cl. 426—32 7 Claims

1. A method for increasing the palatability of a nutritionally balanced dry dog food, which comprises:

(a) reacting an aqueous mixture of a reducing sugar, animal blood, fat, yeast or yeast extract with lipase and protease, at a temperature, pH, and for a time effective to cause lipolytic and proteolytic reaction;

(b) heating the resulting aqueous reaction mixture to a temperature and for a time effective to inactivate the enzymes and to also further develop the palatability of the mixture, to produce a palatability enhancer;

and (c) applying an external coating of the palatability enhancer onto a dog food in an amount, between 1% and 5 % based on the total weight of the dog food, which is effective to increase the palatability thereof.

4,089,979

FORMULATION OF FEED ADDITIVES, MINERAL SUPPLEMENTS AND LIQUID FEEDS FOR ANIMALS AND PRESERVATIVES FOR SILAGE, HAY AND GRAIN

Peter Jackson, Bracknell, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 370,790, Jun. 18, 1973, abandoned.
This application Apr. 3, 1975, Ser. No. 564,750
Claims priority, application United Kingdom, Jun. 30, 1972, 30765/72
Int. Cl.² A23K *1/22*
U.S. Cl. 426—69 4 Claims

1. An animal feed supplement composition suitable for animal feedstuffs, animal feed additives, and animal mineral supplements comprising a nitrogen-containing active ingredient selected from the group consisting of urea, urea-phosphate and mixtures thereof and a phosphorus-containing active ingredient selected from the group consisting of phosphoric acid, urea-phosphate and mixtures thereof, in admixture with a thixotropic agent of a copolymer of methylvinyl ether and maleic anhydride, said thixotropic agent being present in an amount such that, in the presence of added water and molasses the composition forms a pseudoplastic thixotropic gel having a viscosity in excess of 10 poise and containing between 0.2 and 3% of the said thixotropic agent by weight of the gel.

4,089,980

PROCESS FOR NPN RUMINANT FEED SUPPLEMENT

Kenneth L. Berger, Palo Alto; Jorge J. Nassar, Sunnyvale, and William B. Benken, Mission Viejo, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Feb. 25, 1977, Ser. No. 772,037
Int. Cl.² A23K *1/22*
U.S. Cl. 426—69 12 Claims

1. A process for the preparation of an NPN ruminant feed supplement, which process comprises:

(a) mixing a cellulose-containing commodity, urea and a dilute mineral acid to afford a mixture having a pH less than 1,

(b) heating the above mixture at an elevated temperature for a period of time sufficient to cause the chemical binding of urea to a level of at least 40% of theoretical of the monosaccharide potential of said cellulose-containing commodity based on a 1:1 molar ratio of binding of urea to monosaccharide, and

(c) adjusting the pH of the mixture obtained in step (b) to between about 3 and 7.

4,089,981

FIBROUS SIMULATED FOOD PRODUCT WITH GEL STRUCTURE

Terence W. Richardson, Oakland, Calif., assignor to Maxfibe Foods, Inc., Palm Desert, Calif.

Filed Jun. 4, 1976, Ser. No. 693,094
Int. Cl.² A23L *1/04*
U.S. Cl. 426—104 29 Claims

1. A fibrous food composition for simulated food products consisting essentially of:

(a) between about 10% and 85% of the composition on a dry weight basis comprising particulate fibrous cellulose having an average particle length of not more than about 40 microns;

(b) a mixture of edible oil and edible gum in water, the edible oil comprising between about 12.5% and 60% of the composition on a dry weight basis and the edible gum comprising between about 0.1% and 5% of the composition on a dry weight basis; and

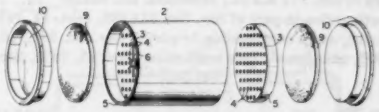
(c) a cohesive gelling agent uniformly mixed with said mixture of edible oil and edible gum in water and said particulate fibrous cellulose, said cohesive gelling agent being present in an amount sufficient to provide a cohesive gel structure which supports the mixture of edible oil and edible gum in water and the particulate fibrous cellulose.

4,089,982

METHOD AND APPARATUS FOR THE PRODUCTION OF WRAPPED FOODS

Kingo Miyahara, Tokyo, Japan, assignor to Dowa Co., Ltd., Tokyo, Japan

Filed Jun. 10, 1976, Ser. No. 694,680
Claims priority, application Japan, Jun. 12, 1975, 50-71233; Jun. 12, 1975, 50-71234; Mar. 24, 1976, 51-31454; Mar. 24, 1976, 51-31455
Int. Cl.² A23L *3/32*
U.S. Cl. 426—107 4 Claims



3. A foodstuff wrapping tube unit comrising an electrically insulating wrapping tube filled with unprocessed foodstuff and comprising a cylindrical body and end plate means bonded to open opposite end portions of said cylindrical body, said end plate means each comprising a member having a flat surface portion formed with apertures therein and a protruding edge portion formed integrally with and disposed at right angles to said flat surface portion and directed to the respective open end portion of the tube, a pair of moisture absorbing electrical contact members previously impregnated with a salt solution and fitted into surface contact with the flat surface of said end plate means and a pair of sealing members detachably applied to the outer surface of said electrical contact members to provide a seal to said wrapping tube.

4,089,983

COLOR-STABILIZED SEMI-MOIST FOOD AND PROCESS

Larry L. Hood, Crystal Lake, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Dec. 1, 1976, Ser. No. 746,602
The portion of the term of this patent subsequent to Jan. 4, 1994, has been disclaimed.
Int. Cl.[2] A23L *1/27*; A23K *1/04*
U.S. Cl. 426—250 17 Claims

1. In a semi-moist meat-like pet food having a moisture content of 15 percent to 50 percent comprising:

a. about 3 percent to about 65 percent of a protein source selected from the group consisting of an animal protein source containing hemoglobin or myoglobin, and at least one component selected from the group consisting of a vegetable protein, a meat meal, and an animal protein source substantially free of hemoglobin or myoglobin;

b. a sufficient amount of a microbiological and bacteriological inhibitor system to provide semi-moist stability for the semi-moist pet food;

c. sufficient additives to adjust taste and nutrition; and

d. a coloring agent — all percentages being based on the weight of the pet food; the improvement wherein the coloring agent is at least partially replaced with a reaction product comprising at least part of the animal protein source containing hemoglobin or myoglobin and carbon monoxide.

4,089,984

SWEET COATINGS FOR FOOD PRODUCTS

Dennis Gilbertson, Golden Valley, Minn., assignor to General Mills, Inc., Minneapolis, Minn.

Filed May 24, 1976, Ser. No. 689,438
Int. Cl.[2] A23L *1/164*
U.S. Cl. 426—293 9 Claims

1. A process for preparing a pre-sweetened cereal comprising applying a coating of a hot, normally liquid sweetener selected from the Group consisting of fructose, maltose, dextrose and mixtures thereof to pieces of ready-to-eat cereal thereby yielding a product which is sticky and difficult to dehydrate to a solid non-adhesive state and then applying a powdered edible material to said coated pieces in an amount sufficient to make the said coated pieces non-sticky, said hot, normally liquid sweetener being at a temperature of 212° to 300° F. and containing 5 to 20 percent by weight water and 80 to 95 percent by weight solids.

4,089,985

PAPAYA JUICE PRODUCT AND PROCESS

H. Ezra Wolff, 779 Kii St., Honolulu, Hi. 96825

Continuation-in-part of Ser. No. 522,988, Nov. 11, 1974, abandoned, and a continuation-in-part of Ser. No. 571,310, Apr. 24, 1975, abandoned. This application Nov. 15, 1976, Ser. No. 742,365
Int. Cl.[2] A23L *2/04*
U.S. Cl. 426—487 18 Claims

1. The process of preparing a liquid extract of fresh papaya which comprises the following steps:

a. extraction of meat from fresh papayas, separating out and discarding the seeds and skins thereof;

b. placing the extracted papaya meat without added water in a blender having rotatable impeller cutter blades in a blender container;

c. placing a cover on the blender container;

d. homogenizing the papaya meat in the blender by rotating the impeller cutter blades for at least 10 minutes at a sufficiently high speed that considerable heat is added to the papaya meat as it is being homogenized so that the added heat raises the temperature of the homogenized papaya meat to a temperature of about 195° F;

e. continuing to rotate the impeller cutter blades at high speed for at least three minutes with the cover on thus holding the temperature of the material being homogenized at a temperature of about 195° F or higher thus insuring thorough pasteurization during homogenizing;

f. removing the cover from the blender container and continuing the high speed blending for at least five minutes with the cover removed; and

g. stopping the high speed blending and removing the homogenized and pasteurized material from the blender and placing it in a container.

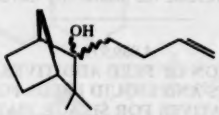
4,089,986

FLAVORING WITH NORBORNANOL DERIVATIVES

Kenneth K. Light, Long Branch; Manfred Hugo Vock, Locust, both of N.J.; Edward J. Shuster, Brooklyn, N.Y., and Frederick Louis Schmitt, Holmdel, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 740,937, Nov. 11, 1976, Pat. No. 4,064,184. This application Sep. 19, 1977, Ser. No. 834,399
Int. Cl.[2] A23L *1/226*
U.S. Cl. 426—538 2 Claims

1. A process for augmenting or enhancing the cinnamon taste or aroma of a foodstuff comprising the step of adding thereto from 0.5 ppm up to about 100 ppm by weight of the compound having the structure:



wherein the wavy lines are representative of "exo" or "endo" configurations.

4,089,987

WHIPPING COMPOSITION OF MODIFIED WHEY PROTEIN AND ADDITIVES

Pei K. Chang, Montrose, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Sep. 23, 1976, Ser. No. 726,031
Int. Cl.[2] A23C *21/00*
U.S. Cl. 426—564 12 Claims

1. An improved whippable whey protein containing composition comprising at least 85% of a whey protein containing product having at least 20 parts soluble whey protein per 100 parts of dry solids in said whey protein product in combination with a number selected from the group consisting of from about 1% to about 10% gelatin; from about 1% to about 10% gelatin and from about 5% to about 15% of a water soluble polyphosphate, the additive total of gelatin and phosphate not to exceed about 15%; from about 0.5% to about 5% of a gum; and mixtures thereof; said whey protein containing product being selected from the group consisting of:

a. a whey protein concentrate derived by the ultrafiltration of cottage cheese whey;

b. a water soluble low molecular weight whey protein product prepared by adjusting the pH of a solution containing a whey protein to a value of from about 11 to about 13, thereafter reducing the pH to a value of from about 4 to about 6 to yield a water solution of a water soluble whey product and insoluble whey solids, separating the water soluble whey final product and drying the same;

c. a whey protein product prepared by hydrolyzing the insoluble whey solids of step (b) at a pH of between about 11 and about 13 for a period of time and at a temperature sufficient to hydrolyze the same; and

d. a precipitated whey protein prepared by combining liquid whey with an effective amount of sodium lauryl sulfate to form a sodium lauryl sulfate-protein complex which precipitates from solution, followed by reducing the sodium lauryl sulfate content of the complex to less than 0.1% by

weight based on the dry weight of the complex, all percentages are by weight based on the total weight of the whey-protein containing composition.

4,089,988

STARCH BASED DESSERT COMPOSITION

William Max Mostyn; Roger Percy Verrall, and Brian Clifford Shrimpton, all of Banbury, England, assignors to General Foods Ltd., Banbury, England

Filed Nov. 17, 1976, Ser. No. 742,476
Int. Cl.[2] A23L *1/187, 1/195*
U.S. Cl. 426—578 5 Claims

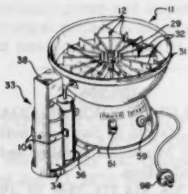
1. A process for the preparation of a dessert composition in a dried, granular and free-flowing form, which comprises admixing starch powder and sugar particles while spraying water in a controlled manner on the mixed particles to provide a moisture content of 13 to 18% by weight, granulating the moistened mixture by extrusion, drying the resultant granules to a moisture content of 5 to 6% by weight, and grinding and screening the dried granules to a particle size from No. 10 to No. 36 British Standard Mesh.

4,089,989

METHOD FOR PREPARING MICROSCOPE SLIDES BY ROTATING DURING COATING

Ronald D. White, 6466 Saipan St., Cypress, Calif. 90630, and John F. Gibson, 543 Cerritos Ave., Long Beach, Calif. 90802

Division of Ser. No. 565,149, Apr. 4, 1975, Pat. No. 4,004,550, which is a continuation of Ser. No. 419,947, Nov. 29, 1973, abandoned. This application Oct. 26, 1976, Ser. No. 735,602
Int. Cl.[2] G01N *1/00, 1/30, 33/16*
U.S. Cl. 427—2 5 Claims



1. A method of applying the same quantity and a uniform distribution of a solution onto the faces of a plurality of microscope slides having specimens disposed thereon for subsequent microscopic viewing, comprising:

rotating said plurality of slides about a common vertical axis such that the face of each slide is in a radial plane;

simultaneously producing an atomized spray of said solution;

depositing said atomized spray uniformly on the faces of the slides during the rotating of the slides.

4,089,990

BATTERY PLATE AND METHOD OF MAKING

Henry D. Walker, 4906 Bluebell Ave., North Hollywood, Calif. 91607

Filed Mar. 14, 1974, Ser. No. 451,107
Int. Cl.[2] C23C *11/00, 13/00*
U.S. Cl. 427—38 9 Claims

1. A method of producing a coated battery plate comprising:

(a) placing a plate to be coated and a supply of lead in a reduced pressure chamber containing an inert gas;

(b) connecting said plate as a cathode electrode and the lead as an anode electrode to an electrical power source to produce an electric field; and

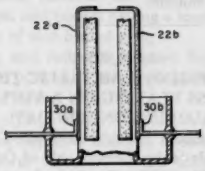
(c) coating said plate with lead particles dislodged from the anode by ionizing the gas to produce ion bombardment of the electrodes.

4,089,991

PROCESS FOR APPLYING ELECTRICAL CONDUCTORS FOR DEWAR FLASK

Gene A. Robillard, Stoneham, Mass., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 614,805, Sep. 19, 1975, abandoned. This application Apr. 7, 1977, Ser. No. 785,724
Int. Cl.[2] H01R *43/00;* H01J *5/02*
U.S. Cl. 427—75 12 Claims



1. A method for providing electrical conductive paths in photodetector mounting apparatus having an inner flask with top and side surfaces, the method comprising:

depositing an electrically conductive, reflective film over a first area of the inner flask including at least a portion of both the side and top surfaces of the inner flask; and

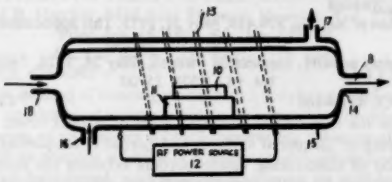
selectively removing just those portions of the electrically conductive, reflective film substantially needed to effect separations between the desired electrical conductive paths to thereby provide a plurality of closely spaced, separate electrical paths extending from the side surface onto the top surface of the inner flask such that the electrical conductive paths continue to cover nearly all of the side surface portion included within the first area to thereby form a heat load reducing reflector for at least this side surface portion.

4,089,992

METHOD FOR DEPOSITING CONTINUOUS PINHOLE FREE SILICON NITRIDE FILMS AND PRODUCTS PRODUCED THEREBY

Ven Y. Doo, Poughkeepsie; Donald R. Nichols, Patterson, and Gene A. Silvey, Elizaville, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 142,013, May 10, 1971, abandoned, which is a continuation of Ser. No. 629,338, Feb. 8, 1967, abandoned, which is a continuation-in-part of Ser. No. 494,790, Oct. 11, 1965, abandoned. This application Aug. 30, 1976, Ser. No. 718,720
Int. Cl.[2] B05D *5/12*
U.S. Cl. 427—94 7 Claims



1. A process for depositing a pin-hole free film of silicon nitride of substantially uniform thickness comprising the steps of:

A. placing a substrate in a reaction zone,

B. introducing into said zone a mixture consisting essentially of silane, a gaseous nitrogen containing compound which upon decomposition introduces nascent nitrogen wherein the ratio of said silane to said nitrogen compound is from

about 3:4 to about 1:300 by volume, and a carrier gas inert to the reactants, wherein said carrier gas is present in an amount sufficient to retard the reaction of said silane and nitrogen compound in said reaction zone, and

C. heating said substrate to a temperature of from 700°–1100° C to bring about the deposition of a pinhole-free film of silicon nitride of substantially uniform thickness of 0.1–2 microns on the surface of said substrate, wherein the deposition rate is from about 100 to about 400 Angstroms per minute.

4,089,993

METHOD OF FORMING A METALLIC THIN FILM BY ELECTROLESS PLATING ON A VINYLIDENE CHLORIDE UNDERCOAT

Ryuji Shirahata; Masaaki Suzuki; Yasuyuki Yamada; Tatsuji Kitamoto, and Shin-ichiro Dezawa, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Oct. 19, 1976, Ser. No. 733,920

Claims priority, application Japan, Oct. 21, 1975, 50-125915

Int. Cl.² C23C *3/02*

U.S. Cl. 427—129 **12 Claims**

1. A method of forming a metallic thin film on a plastic substrate by electroless plating which consists essentially of

(a) providing on a surface of the substrate an undercoated layer of a vinylidene chloride copolymer selected from the group consisting of vinylidene chloride-vinyl chloride copolymers and vinylidene chloride-acrylonitrile copolymers, the vinylidene chloride copolymer having a softening point of 100° to 200° C and a degree of polymerization of at most 1000 and having a vinylidene chloride content of 8 to 98% by weight,

(b) subjecting the surface of the layer to surface activating treatment of (1) sensitizing the surface with a sensitizer solution containing hydrochloric acid and stannous chloride followed by activation with an activator containing a noble metal ion, or (2) contacting the surface with a catalyst containing stannous and noble metal ions followed by contacting the surface with an accelerator, and

(c) subjecting the resulting surface to electroless plating in an electroless plating bath containing 0.02 to 0.6 mol/l of cobalt ion, 0 to 0.02 mol/l of nickel ion and 0.03 to 0.4 mol/l of hypophosphite ion, optionally with a complexing agent, pH buffering agent and pH regulator, whereby metal ions are deposited on the surface.

4,089,994

METHOD OF REPAIRING LACQUER DAMAGE

Hjalmar Egon Mattsson; Lars Magnus Severinsson, and Bengt Erik Carsten, all of Malmo, Sweden, assignors to Auto-Make Up, Sweden

Division of Ser. No. 579,418, May 21, 1975. This application Jul. 8, 1976, Ser. No. 703,643

Claims priority, application Sweden, May 24, 1974, 7406918

Int. Cl.² B32B *35/00*

U.S. Cl. 427—140 **7 Claims**

1. In the repairing of damaged areas of lacquer coats, spot repairing of lacquered surfaces and partial re-lacquering, the method of obliterating visible borders between the new coloured lacquer applied and the adjoining regions of the original lacquer coat, consisting of priming the damaged areas and spraying onto the newly applied lacquer and the immediately adjacent areas of the original lacquer coat a border line obliterating liquid which consists of a clear lacquer composition of a mixture of from between 65 and 80 parts by weight of polymethyl methacrylate and 35 to 20 parts by weight of cellulose acetate butyrate, the ratio of butyryl to acetyl being about 3:1, said composition being dissolved in an organic solvent or solvent mixture in such an amount that the border line obliterating liquid will have a viscosity suitable for spray application.

4,089,995

PHOSPHORESCENT MATERIALS

Berkeley Michael Ferro, Barnehurst; Rodney Edwin Spratling, Sittingbourne, and Aubrey Douglas Walker, North Harrow, all of England, assignors to Post Office, London, England

Division of Ser. No. 543,154, Jan. 22, 1975, Pat. No. 4,022,709. This application Dec. 7, 1976, Ser. No. 748,161

Claims priority, application United Kingdom, Jan. 25, 1974, 3478/74

Int. Cl.² G09F *3/00*; C09D *11/10*; C09K *11/06*

U.S. Cl. 427—157 **28 Claims**

1. A process for rendering at least part of a surface phosphorescent, which includes the steps of

(a) applying to said at least part of said surface a composition comprising a solution of a phosphorescence activator and a soluble precondensate obtained by a reaction between formaldehyde and an amino compound, which precondensate is capable of further reaction in the absence of the phosphorescence activator whereby there is formable an insoluble condensation product that does not substantially absorb ultraviolet radiation at any wavelength at which the phosphorescence activator substantially absorbs ultraviolet radiation, and is capable of such further reaction in the presence of the phosphorescence activator to form a phosphorescent insoluble condensation product, and

(a) by such further reaction forming the phosphorescent insoluble condensation product in situ on said at least part of said surface.

4,089,996

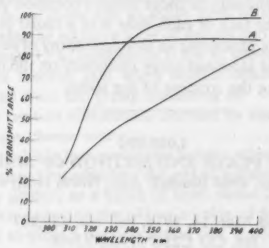
ULTRAVIOLET ABSORBING COATINGS

Roger W. Lange, and Harold G. Sowman, both of Maplewood, Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation of Ser. No. 534,371, Dec. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 455,212, Mar. 27, 1974, abandoned. This application Jan. 28, 1977, Ser. No. 763,581

Int. Cl.² B05B *5/00*

U.S. Cl. 427—160 **1 Claim**



1. A process for the protection of ultraviolet degradable polymeric substrate from the effect of ultraviolet radiation comprising coating said polymeric substrate on at least one surface with solutions of lower alkyl titanate and soluble non-organic stannous salt simultaneously or successively, drying, and heating the dried coated polymeric substrate to a temperature of from about 20° to 120° C. for a time respectively of from about 75 hours to about 1 minute.

4,089,997
PROCESS OF APPLYING ANTISTATIC COATING COMPOSITIONS TO POLYESTER FILMS

August Jean Van Paesschen, Antwerpen, and Lucien Janbaptist Van Gossum, Kontich, both of Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium

Continuation of Ser. No. 576,740, May 12, 1975, abandoned. This application Jan. 19, 1977, Ser. No. 760,517
Claims priority, application United Kingdom, May 14, 1974, 21324/74
Int. Cl.[2] G03C *1/78, 1/96*
U.S. Cl. 427—171 9 Claims

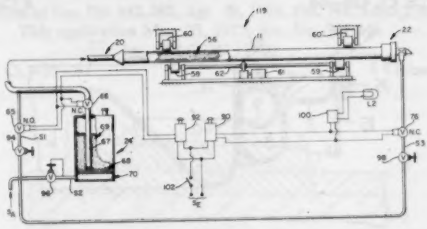
1. Process for adhering an antistatic layer to a dimensionally stable polyester film support, which process comprises applying directly to an unstretched or only monoaxially stretched polyester film support an antistatic layer from an aqueous coating composition, drying said antistatic layer and stretching the polyester support carrying the dried antistatic layer biaxially or in a direction perpendicular to the first stretching operation, and heat-setting the thus coated and stretched polyester film, said aqueous coating composition consisting essentially of 30 to 80% by weight of an electroconductive polymer, 10 to 40% by weight of a stretch-improving agent for said polymer selected from the group consisting of

(a) an aliphatic polyhydroxy compound,
(b) caprolactam,
(c) N,N'-dimethyl urea, and
(d) an aliphatic or aromatic carboxylic or sulfonic acid and 10 to 40% by weight of a filler material selected from the group consisting of a non-electroconductive polymer of an α,β-ethylenically unsaturated monomer in dispersed particle form, an inorganic pigment, a silane compound hydrolyzable in situ to amorphous silicon dioxide, and gelatin, said electroconductive polymer having at least 50% of its recurring units carrying an electroconductive anionic or cationic group and imparting to said antistatic layer an electrical surface resistance lower than 1×10^{10} ohm/sq area measured at 30% R.H.

4,089,998
METHOD OF POWDER COATING THE INTERIOR OF TUBULAR GOODS

Jack E. Gibson, 3807 Melody La., Odessa Tex. 79762

Filed Jul. 13, 1976, Ser. No. 704,965
Int. Cl.[2] B05D *7/22, 3/02*
U.S. Cl. 427—182 13 Claims



1. Method of coating the interior surface of a pipe with a plastic coating of substantially uniform thickness, comprising:

1. selecting a thermoplastic synthetic resin material in particulate form wherein the selected material is capable of being bonded to the interior pipe surface;
2. forming a fluidized bed of said thermoplastic material;
3. heating said pipe to be coated to a temperature above the softening temperature of said thermoplastic material;
4. applying air pressure to an inlet end of the heated pipe to cause a flow to occur therethrough;
5. applying a reduced pressure at the outlet end of said heated pipe;
6. flowing a pocket of thermoplastic material from said fluidized bed into said inlet end of said pipe while the interior surface of said pipe is above the softening temperature of the resin material by simultaneously discontinuing the application of said air pressure to said inlet end of said heated pipe and connecting said inlet end of the heated pipe to said fluidized bed while continuing to apply said reduced pressure;
7. re-applying said air pressure and simultaneously discontinuing said flow from said fluidized bed after a pocket of thermoplastic material has been transferred into said heated pipe, said pocket having a length which is less than the length of said heated pipe;
8. removing said reduced pressure from said heated pipe before said pocket of thermoplastic material reaches the end of said heated pipe;
9. said re-applying of said air pressure effecting an application of thermoplastic material in said pocket in substantially uniform thickness to the interior surface of said heated pipe along the full length of said heated pipe;
10. fusing the deposited thermoplastic material on the interior of the heated pipe at a pressure which is in excess of the ambient pressure;
11. spinning said pipe about its longitudinal axis during steps 6, 7, 8, 9, and 10 at a rotational velocity which causes any melted thermoplastic material applied to the interior wall of said pipe to spread out into a continuous smooth coating.

4,089,999
IMPREGNATION AND PRIMER COATING OF ABSORPTIVE SUBSTRATES WITH PLASTICS DISPERSIONS

Josef Mondt, Konigstein, Taunus; Karl Josef Rauterkus, Kelkheim, Taunus; Heinz Lehmann, Kriftel, Taunus; Werner Stelzel, Bad Soden am Taunus, and Hans Vitzthum, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jul. 15, 1976, Ser. No. 705,447
Claims priority, application Germany, Jul. 17, 1975, 2531895
Int. Cl.[2] B05D *7/26;* B32B *3/26*
U.S. Cl. 427—385 R 1 Claim

1. A process for impregnating and primer coating absorptive substrates with a film-forming polymer which comprises applying to said substrate an aqueous plastics dispersion comprising about 5 to about 25% by weight of solid matter, the polymer particles of which have an average size of about 0.036 to 0.080 microns.

4,090,000
METHOD FOR TREATING CELLULOSIC MATERIAL

David B. Hatcher, 8433 Katy Freeway, Houston, Tex. 77024

Filed Jan. 15, 1976, Ser. No. 649,705
Int. Cl.[2] B27K *3/00;* B44D *1/26, 1/44*
U.S. Cl. 427—393 5 Claims

1. A method of treating wood with a polyhalophenol of the class consisting of polybromophenols and polychlorophenols by means of an aqueous solution, comprising the steps of preparing an aqueous solution of a water-soluble alkaline salt of the polyhalophenol, said solution containing an acid-former which undergoes a reaction in such solution to liberate an acidic substance which displaces the polyhalophenol from said salt, said reaction being on which proceeds only gradually at ordinary temperatures, impregnating wood, with said solution while said salt is still in solution, and then maintaining the wood under conditions at which said reaction proceeds to liberate a sufficient amount of said acidic substance to cause the polyhalophenol to precipitate, the proportion of said acid-former being sufficient so that said reaction causes precipitation of at least a substantial proportion of the polyhalophenol contained in said salt.

4,090,001

COMPOSITIONS FOR DENATURING PAINTS, ESPECIALLY FOR CLEANING PAINTING CABINS

Anne-Marie Mertzweiller nee Maillard, and Guy Etienne, both of Pont-a-Mousson, France, assignors to Air-Industrie, Courbevoie, France

Continuation of Ser. No. 454,704, Mar. 25, 1974, abandoned. This application Nov. 22, 1976, Ser. No. 743,906
Claims priority, application France, Mar. 28, 1973, 73.11107
Int. Cl.[2] B08B 7/00; C09D 9/04; C11D 1/66; C23D 17/00
U.S. Cl. 427—444 12 Claims

10. In a method of preventing formation of paint, size or primer deposits on the walls and bottom of paint booths during use by applying to said walls and bottom an aqueous alkaline denaturing composition, the improvement comprising employing as said alkaline denaturing composition an alkaline aqueous solution comprising an effective amount of a polyether compound having the formula:

$$R-O-[(CH_2-CH_2-O)_n(CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-O)_p]-H$$

in which R contains at least 10 carbon atoms and is selected from an alkyl, aryl-alkyl, aryl or alkyl-aryl group, and n and p are integers of which one can be 0, the sum $n + p$ being at least 12.

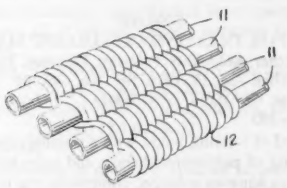
11. A method according to claim 10, wherein the processed paint, size or primer dispersed in said solution is further allowed to settle to remove at least partially said denatured paint, size or primer from the solution which may be recirculated.

4,090,002

REINFORCED FIBER STRUCTURES AND METHOD OF MAKING THE SAME

Jesse Rosenblum, 112 Roosevelt St., Closter, N.J. 07624

Filed Apr. 16, 1973, Ser. No. 351,521
Int. Cl.[2] D03D 15/02, 15/06
U.S. Cl. 428—36 25 Claims



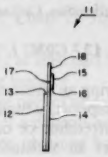
1. A structural member comprising: a solidified cured synthetic resin portion and a fibrous reinforcement comprising elongated fibers embedded in said resin portion and bent into the configuration of, and extending in the direction of, either warp or woof fibers, but not both, of a woven fabric, certain of said fibers being bent to define one side of open loop areas, each of said areas having a size and shape determined by the size and shape of the missing woof or warp strands, respectively, of said fabric, and the next adjacent fiber on at least one side of said certain fibers being bent to define the opposite side of at least selected ones of said open loop areas.

4,090,003

RECORDING TAPE APPLICATOR

Robert B. Pierson, Webster, N.Y., assignor to Tapecon, Inc., Rochester, N.Y.

Filed Jun. 3, 1977, Ser. No. 803,370
Int. Cl.[2] B32B 7/06; G11B 5/84
U.S. Cl. 428—42 6 Claims



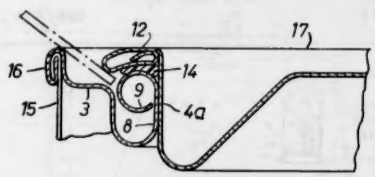
1. A recording tape applicator comprising:
a. a card having an edge forming an abutment surface;
b. a release sheet secured to said card and extending outward beyond said abutment surface;
c. a strip of magnetic recording tape adhesively supported by said release sheet on the side of said release sheet opposite said card;
d. said recording tape being positioned outward from and accurately parallel with said abutment surface; and
e. said release sheet having a slit extending for the length of said recording tape along a midregion of said recording tape to allow removal of an outer portion of said release sheet along said slit to expose an outer portion of said recording tape for adhesively securing said tape to an object while said tape is supported by said remainder of said release sheet for positioning said tape parallel with an edge of said object butted against said abutment surface.

4,090,004

CONTAINERS

Charles N. Tebbutt, Ruislip, and Charles D. V. Still, Wallingford, both of England, assignors to Metal Box Limited, Reading, England

Filed Jan. 9, 1976, Ser. No. 648,034
Claims priority, application United Kingdom, Jan. 13, 1975, 1428/75
Int. Cl.[2] B21D 51/00; F24M 3/00
U.S. Cl. 428—64 8 Claims



1. A method of forming a two-piece container closure of the type including an annular ring having means for securement to a container, and a separable lid interlockingly engageable with said annular ring, said method comprising the steps of forming sheet material into a generally cup shaped preform having first and second portions generally corresponding to said annular ring and said lid, separating said first and second portions, and separately further shaping said first and second portions to form said annular ring and said lid, said step of forming said preform including the steps of forming on said first and second portions concentric upstanding wall portions, forming an annular step between said wall portions with said annular step sloping outwardly and axially from said second portion to said first portion and directly connecting together said concentric upstanding wall portions, and effecting said separating of said

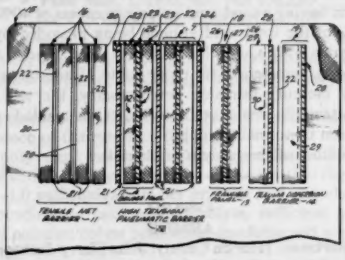
first and second portions by applying opposed radially offset concentric forces on said annular step and both severing said annular step in two parts and deforming the two parts of said annular step as a first step of said further shaping of said first and second portions.

4,090,005

PROTECTIVE ARMOR WITH PANELS MOVABLE WITH RESPECT TO EACH OTHER

James L. Morgan, 6311 Yucca St., Los Angeles, Calif. 90026

Filed Nov. 29, 1974, Ser. No. 528,438
Int. Cl.² F41H 5/08
U.S. Cl. 428—76 37 Claims



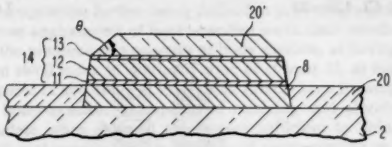
1. Protective armor comprising a flexible stack of flexible panels, each panel including between about two and about four sheets of woven fibrous ballistic material secured together with a flexible layer of bonding agent, the thickness of the layer being substantially less than the thickness of the sheets, and the panels in the stack being movable with respect to each other.

4,090,006

STRUCTURE FOR MAKING COPLANAR LAYERS OF THIN FILMS

Janos Havas, Hopewell Junction; John S. Lechaton, Wappingers Falls, and Skinner Logan, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 681,380, Apr. 29, 1976, Pat. No. 4,035,276.
This application Mar. 25, 1977, Ser. No. 781,246
Int. Cl.² C23C 15/00
U.S. Cl. 428—81 5 Claims



1. A structure used for fabricating multiple levels of substantially coplanar thin films comprising:

a support body;

a substantially coplanar pattern of a conductive film and an insulative film disposed on said support body;

an expendable material disposed atop said conductive film, the side surfaces of said material being exposed;

another insulative film disposed atop said expendable material; p1 the side surfaces of said other insulative film having a slope of around 31° or less with respect to the plane of the upper surface of said expendable material.

4,090,007

EMBOSSED PLASTIC SURFACE COVERING AND METHOD OF PREPARING SAME

Richard P. Crowley, Suite 24H, 65 East India Row, Boston, Mass. 02110

Continuation-in-part of Ser. No. 228,396, Feb. 22, 1972, Pat. No. 3,857,915, which is a continuation of Ser. No. 28,052, Apr. 13, 1970, abandoned, which is a continuation-in-part of Ser. No. 566,810, Jul. 21, 1966, Pat. No. 3,519,527, which is a continuation-in-part of Ser. No. 541,100, Apr. 8, 1966, Pat. No. 3,453,171. This application Nov. 26, 1974, Ser. No. 527,265
The portion of the term of this patent subsequent to Dec. 24, 1991, has been disclaimed.
Int. Cl.² B29H 7/20; B32B 3/00
U.S. Cl. 428—159 14 Claims

1. A method of preparing a cellular chemically embossed sheet material, which method comprises:

(a) providing a gas-expandable thermoplastic resin sheet material containing an expanding amount of a blowing agent of from about 0.5 to 10 parts per hundred parts of resin and a polymerizable amount of from about 2 to 25% by weight of a free radical catalyst adapted on heating to dissociate into free radicals and to polymerize an acrylic polymerizable monomer, the sheet material essentially free of such acrylic polymerizable monomer;

(b) treating the surface of the said sheet material with an acrylic polymerizable monomer in a liquid carrier in a predetermined pattern and permitting the liquid carrier and monomer to penetrate into the depth of the sheet material; and

(c) heating the treated sheet material to provide the formation of free radicals with essentially no residual catalyst remaining in the sheet material, the polymerization of the monomer in the sheet material and the expansion of the thermoplastic resin sheet material, the polymerization of the monomer by the catalyst inhibiting full expansion in the treated pattern area, and effecting chemical embossing of the sheet material.

8. The chemically embossed product produced by the method of claim 1.

4,090,008

EDGE ABRASION RESISTANT PLASTIC STRAPPING AND METHOD AND APPARATUS FOR MAKING THE SAME

Harold A. Haley, Media, Pa., assignor to FMC Corporation, Philadelphia, Pa.

Filed May 12, 1976, Ser. No. 685,554
Int. Cl.² B32B 3/02
U.S. Cl. 428—192 10 Claims

5. A generally rectangular plastic strapping having improved resistance to edge abrasion, said strapping formed of orientable, thermoplastic, polymeric material and having been worked to orient the molecules thereof in predominantly the longitudinal direction of the strapping, the surfaces of the opposite longitudinal edges of said molecularly oriented strapping beng substantially free of projecting fibrils and having at least portions thereof which are fused and essentially free of molecular orientation as a result of a confined application of heat essentially to only the surfaces of the opposite longitudinal edges of the molecularly oriented strapping followed by cooling thereof to room temperature.

4,090,009

NOVEL SILVER COMPOSITIONS

Samuel Jacob Horowitz, Snyder, N.Y., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 11, 1977, Ser. No. 776,720
Int. Cl.² H01B 1/02
U.S. Cl. 428—208 16 Claims

1. Silver conductor compositions useful for forming highly adherent conductive films on ceramic dielectric substrates, said

compositions having reduced tendency to stain the surface of the substrate, said compositions comprising finely divided inorganic powder dispersed in an inert liquid vehicle, wherein said inorganic powder comprises, by weight,

1. 75–91% metal powder of Ag and Pd wherein the weight ratio of Ag/Pd is in the range 2/1 to 15/1, and
2. 9–25% inorganic binder of,
   a. 2–6 parts bismuth-free glass,
   b. 2–9 parts copper oxide,
   c. 2–9 parts polynary oxide, and
   d. 0–6 parts lead oxide

said polynary oxide having a pyrochlore-related crystal structure and a formula selected from the class consisting of $Pb_2Ru_2O_6$ and $Cu_xM_{2-x}M'_2O_{7-z}$ wherein

i. M is Bi or a mixture of at least one-half Bi plus up to one-half of one or more cations from among
   A. bivalent Cd or Pb and
   B. trivalent Y, Tl, In and rare earth metals of atomic number 57–71, inclusive;
ii. M' is at least one of
   A. Ru
   B. Ir, and
   C. a mixture of at least three-fourths of at least one of Ru and Ir and up to one-fourth of at least one of Pt, Ti and Rh;
iii. x is in the range 0.10 to 0.60 and
iv. z is in the range 0.10 to 1.0, and is equivalent to the sum of monovalent cations Cu and have of divalent cations in the polynary oxide.

4,090,010

WATER VAPOR PERMEABLE MICROPOROUS SHEET MATERIALS AND THEIR METHOD OF MANUFACTURE

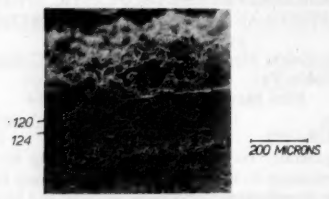
Eric Albert Warwicker, and David Price, both of Norfolk, England, assignors to Porvair Limited, Norfolk, England

Continuation-in-part of Ser. No. 208,042, Dec. 9, 1971, abandoned. This application Jun. 11, 1973, Ser. No. 369,112

Claims priority, application United Kingdom, Dec. 11, 1970, 59121/70

Int. Cl.[2] B29D *27/04;* B32B *3/26*

U.S. Cl. 428—304 **19 Claims**



1. A process for making a microporous sheet comprising:

preparing a mixture of a solution of polymer in a solvent for said polymer, dispersed microscopic removable filler particles and liquid non-solvent for said polymer, said non-solvent being miscible with said solvent and being prevent in amount insufficient to coagulate said solution or convert said solution to a colloidal gel, said polymer comprising elastomeric polyurethane, the proportion of polymer in said mixture being at least 20% based on solvent and polymer, the proportion of said removable filler being more than 10% of the weight of polymer,

the proportion of non-solvent being above 1.6% w/w and sufficient to impart to said mixture a viscosity measured at 27° C with a Brookfield RVT viscometer (no. 7 spindle) which shows an increase in viscosity which is at least 30% higher at a spindle speed of 5 r.p.m. than at 1 r.p.m.

spreading said mixture as a layer;

coagulating said layer to microporous self supporting form by treatment of said layer with a non-solvent for the polymer miscible with the solvent and washing out said solvent and removing said non-solvent and said removeable filler particles.

2. Process as in claim 1 including the steps of forming on said layer (hereafter termed "substrate layer"), a topcoat layer prior to said coagulating, and, in said step c, coagulating the two layers simultaneously to an integral self-supporting microporous sheet by said treatment with non-solvent, said topcoat layer comprising thermoplastic elastomeric polymer and a solvent therefor which is miscible with said non-solvent.

8. A process as in claim 2 and including the steps of removing said solvent, non-solvent and removable filler from the coagulated layers, the thickness of the substrate layer being such that after said removal said layer is at least 0.5 mm thick and is characterized by a reticulated matrix of polymer affording a plurality of compact voids intercommunicating by pores, said matrix having a total void volume in excess of 40% and at least 50% of the total void volume being provided by pores and the voids with which the said pores interconnect, the said pores having diameters in the range 6.4 to 25 microns as determined by mercury intrusion penetrometry, the said matrix being substantially free of voids visible to the unaided eye with 20/20 vision in normal daylight.

9. A product of the process of claim 8.

4,090,011

ARMOR

Erick F. Barkman, Henrico County; John Harry Jackson, Richmond, and Bennie Ray Ward, Jr., Chesterfield County, all of Va., assignors to Reynolds Metals Company, Richmond, Va.

Filed Jul. 2, 1964, Ser. No. 380,088

Int. Cl.[2] B22F *3/00*

U.S. Cl. 428—653 **24 Claims**

1. Armor possessing high resistance to penetration, comprising a metallic composite having a layer of aluminous metal bonded to a layer of a precipitation-hardenable ferrous alloy, said composite in bonded condition being susceptible to a thermal hardening treatment to increase the strength of said ferrous alloy layer.

4,090,012

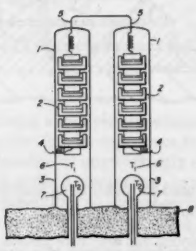
ELECTROCHEMICAL HEAT ENGINE

Guy R. B. Elliott, Los Alamos; Charles E. Holley, Alcalde, both of N. Mex.; Barton L. Houseman, Cockeysville, Md., and Wilmer L. Sibbitt, Jr., Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 5, 1977, Ser. No. 794,297

Int. Cl.[2] H01M *10/34, 10/39*

U.S. Cl. 429—20 **7 Claims**



1. An electrochemical heat engine useful for electric power generation which works on the cyclic decomposition and reformation by electrolysis of chemical compounds comprising at least two cells in electrical series,

(a) means for electrolyzing the said chemical compounds at temperatures higher than ambient and as high as 1600 K,

(b) means for assisting the decomposition electrolysis by removing and cooling one of the decomposition products to a temperature lower than the electrolysis temperature,
(c) means for reheating the cooled decomposition product to the electrolysis temperature,
(d) means for discharging the electrolytic products, and
(e) said chemical compounds are formed from components of which one or more are volatile at the operating temperature of the said heat engine.

4,090,013

ABSORBENT COMPOSITION OF MATTER

Stuart H. Ganslaw, Piscataway, and Howard G. Katz, East Windsor, both of N.J., assignors to National Starch and Chemical Corp., Bridgewater, N.J.

Filed Mar. 7, 1975, Ser. No. 556,291
Int. Cl.[2] C08F 8/42; C08L 3/04, 5/00
U.S. Cl. 526—15 **42 Claims**

1. A dry, solid, water-swellable, water-insoluble absorbent composition of matter consisting essentially of an ionic complex of

(a) an anionic polyelectrolyte which is water-soluble in the absence of the cation of (b); and
(b) a polyvalent metal cation having a valence of at least 3, said cation being present in an amount within the range of 0.1–1.0 milliequivalents per gram of said polyelectrolyte, depending on said polyelectrolyte, sufficient to render said polyelectrolyte both water-insoluble and water-swellable;

said composition further being defined as providing a gelatinous agglomerate of liquid-swollen particulate members in the presence of a quantity of body exudate, as having a film swell index in synthetic urine of at least 15, as being capable of absorbing at least fifteen times its weight in body exudate, as capable of retaining said absorbed exudate when exposed to pressure sufficient to deform said agglomerate, and as capable of uncomplexing at an elevated pH to form said water-soluble anionic polyelectrolyte and recomplexing at a lower pH.

9. A dry, solid, water-swellable, water-insoluble absorbent composition of matter consisting essentially of an ionic complex of

(a) an anionic polyelectrolyte which is water-soluble in the absence of the cation of (b) and has 40–85% of its anionic groups neutralized; and
(b) a polyvalent metal cation having a valence of at least 3, said cation being present in an amount within the range of 0.01–5.0 milliequivalents per gram of said polyelectrolyte, depending on said polyelectrolyte, sufficient to render said polyelectrolyte both water-insoluble and water-swellable;

said composition further being defined as providing a gelantinous agglomerate of liquid-swollen particulate members in the presence of a quantity of body exudate, as having a film swell index in synthetic urine of at least 15, as being capable of absorbing at least about fifteen times its weight in body exudate, as capable of retaining said absorbed exudate when exposed to pressure sufficient to deform said agglomerate, and as capable of uncomplexing at an elevated pH to form said water-soluble anionic polyelectrolyte and recomplexing at a lower pH.

22. A dry, solid, water-swellable, water-insoluble absorbent composition of matter consisting essentially of an ionic complex of

(a) an anionic polyelectrolyte which is water-soluble in the absence of the cation of (b); and
(b) a polyvalent metal cation of aluminum having a valence of 3, said cation being present in an amount within the range of 0.01–5.0 milliequivalents per gram of said polyelectrolyte, depending on said polyelectrolyte, sufficient to render said polyelectrolyte both water-insoluble and water-swellable;

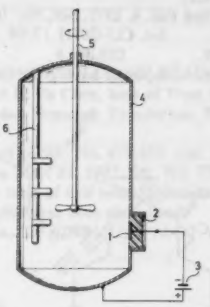
said composition further being defined as providing a gelatinous agglomerate of liquid-swollen particulate members in the presence of a quantity of body exudate, as having a film swell index in synthetic urine of at least 15, as being capable of absorbing at least fifteen times its weight in body exudate, as capable of retaining said absorbed exudate when exposed to pressure sufficient to deform said agglomerate, and as capable of uncomplexing at an elevated pH to form said water-soluble anionic polyelectrolyte and recomplexing at a lower pH.

4,090,014

PROCESS AND APPARATUS FOR POLYMERIZING α-ETHYLENICALLY UNSATURATED MONOMERS IN AQUEOUS MEDIA

Hermann Scheibler; Kasimir Ruchlak, both of Burgkirchen, Alz; Christoph Heinze, Burghausen, Salzach, and Horst Wolff, Neuotting, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 20, 1976, Ser. No. 716,210
Claims priority, application Switzerland, Aug. 26, 1975, 11070/75
Int. Cl.[2] C08F 2/18, 14/06
U.S. Cl. 526—62 **4 Claims**



1. In a process for polymerizing α-ethylenically unsaturated monomers in aqueous media in the presence of free radical forming catalysts and further polymerization auxiliaries in a vessel having an electrically conductive inner wall surface, the electrically conductive inner surface and the elements being electrically connected with at least one electrode insoluble in the liquid polymerization medium and electrically insulated from the wall of the polymerization vessel and the built-in elements, the improvement comprising at least one partial area of the inner wall surface of the vessel comprising the insoluble electrode, wherein the partial area is covered with liquid, is electrically insulated from the remaining surface areas and is provided with an electrical potential difference with respect to the remaining surface areas.

4,090,015

METHOD FOR POLYMERIZING DIENIC MONOMERS

Shunichi Koyanagi; Niichiro Hasegawa; Toshihide Shimizu; Ichiro Kaneko, and Sensaku Katsushima, all of Joetsu, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Japan

Filed Jul. 25, 1977, Ser. No. 818,756
Claims priority, application Japan, Jul. 30, 1976, 51-91068
Int. Cl.[2] C08F 2/24, 2/00, 12/08, 279/04
U.S. Cl. 526—62 **11 Claims**

1. In a method for preparing a polymer with dienic monomer units in a weight fraction of at least 5% by emulsion polymerization in an aqueous medium in the presence of an emulsifier and a polymerization initiator in a polymerization reactor, the improvement comprising forming a coating layer of an organopolysiloxane on the surfaces of the inner walls of the polymeri-

zation reactor and other instruments in contact with the polymerization mixture.

4,090,016

CARBOXYLATED PULLULAN AND METHOD FOR PRODUCING SAME

Kozo Tsuji, Takatsuki; Masanori Fujimoto; Fujio Masuko, both of Ibaragi, and Tsuneyuki Nagase, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Hayashibara Biochemical Laboratories, Inc., both of, Japan

Filed May 24, 1976, Ser. No. 689,064
Claims priority, application Japan, Jun. 17, 1975, 50-74091
Int. Cl.² C08B *37/00*
U.S. Cl. 536—1 **2 Claims**

1. Carboxylated pullulan wherein at least some of the hydroxymethyl groups of the glucose units of the pullulan are converted into carboxyl groups.

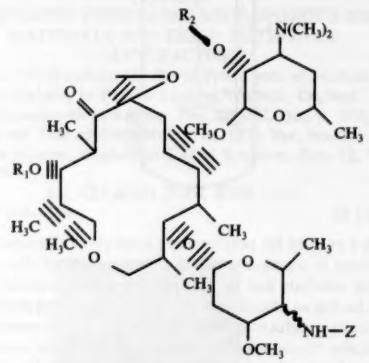
4,090,017

4-DEOXY-4-SUBSTITUTED AMINO DERIVATIVES OF OLEANDOMYCIN

Frank C. Sciavolino, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Feb. 4, 1977, Ser. No. 765,478
Int. Cl.² C07H *17/08*
U.S. Cl. 536—9 **20 Claims**

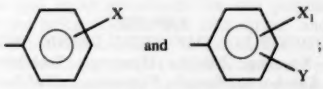
1. An epimeric compound having the formula



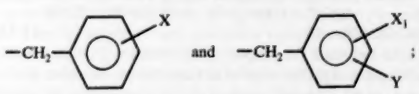
and the pharmaceutically acceptable salts thereof wherein

each of R_1 and R_2 is selected from the group consisting of hydrogen, alkanoyl having from two to three carbon atoms and is selected from the group consisting of acetyl and propionyl;

Z is selected from the group consisting of a first subgroup consisting of



a second subgroup consisting of



and a third subgroup consisting of

—CH_2-heterocyclyl;

wherein

X is selected from the group consisting of hydrogen, chloro, bromo, fluoro, alkyl having from one to four carbon atoms, alkoxy having from one to four carbon atoms, hydroxy, mercapto, trifluoromethyl, $N(CH_3)_2$, cyano, thioalkyl having from one to four carbon atoms, sulfonylalkyl having from one to four carbon atoms, sulfamyl, sulfo, carbamyl, hydroxymethyl and carbalkoxy having from one to four carbon atoms in the alkoxy group;

X_1 is selected from the group consisting of chloro, bromo, fluoro, methyl, methoxy, hydroxy, mercapto and trifluoromethyl;

Y is selected from the group consisting of choro, bromo, fluoro, methyl, methoxy and hydroxy;

and X_1 and Y when taken together are located on adjacent carbon atoms and are alkylenedioxy and are selected from the group consisting of methylenedioxy and ethylenedioxy;

and heterocyclyl is selected from the group consisting of (a) thienyl, furyl, pyridyl and pyrrolyl and substituted derivatives thereof wherein the substituent is selected from the group consisting of methyl, chloro, bromo, hydroxy and hydroxymethyl; and (b) 2-tetrahydrofuryl, 2-dihydropyranyl, 2-tetrahydropyranyl and morpholino.

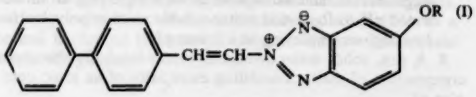
4,090,018

WHITENERS, THEIR PREPARATION AND USE

Josef Schroeder, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

Filed Jan. 13, 1977, Ser. No. 759,007
Claims priority, application Germany, Jan. 16, 1976, 2601469
Int. Cl.² C07D *55/04*
U.S. Cl. 542—458 **1 Claim**

1. 2-Styrylbenztriazoles of the formula



wherein

R denotes C_1–C_4-alkyl, benzyl or C_1–C_4-alkoxyethyl.

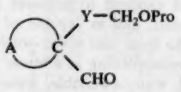
4,090,019

GEMINAL PROSTAGLANDIN ANALOGS

Todd R. Williams, Lake Elmo, and Larry M. Sirvio, Cottage Grove, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

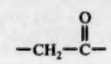
Division of Ser. No. 684,763, May 10, 1976. This application Jan. 31, 1977, Ser. No. 763,838
Int. Cl.² C07D *309/06, 309/26*
U.S. Cl. 542—426 **1 Claim**

1. The aldehyde represented by the formula

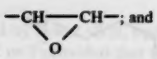


wherein

A is a 4 or 5 carbon atom ring-completing group $(CH_2)_{1+m}$—X—$(CH_2)_z$ where $m = 0$, 1 or 2, $z = 0$ or 1, $0 < (m+z) < 3$, and X is —CH_2—CH_2—, —CH_2—CHOH—,



and, when $m = 0$ and $z = 1$, is also —CH=CH— or



Y is divalent straight chain alkylene of 4 to 8 carbon atoms or $-CH_2CH{=}CH(CH_2)_3-$ and Pro is a tetrahydropyranyl group.

4,090,020

THIENOTHIAZINE DERIVATIVES

Dieter Binder; Otto Hromatka, both of Vienna, Austria; Rudolf Pfister, Basel, and Paul Zeller, Allschwil, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

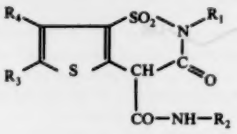
Filed Feb. 9, 1977, Ser. No. 767,016

Claims priority, application Austria, Feb. 23, 1976, 1268/76; Switzerland, Jan. 5, 1977, 83/77

Int. Cl.[2] A61K *31/38;* **C07D** *513/04*

U.S. Cl. 544—48 **15 Claims**

1. A compound of the formula



I

wherein R_1 is lower alkyl, R_2 is an unsubstituted aromatic heterocyclic radical selected from the group consisting of 2-thiazolyl, 4-methyl-2-thiazolyl, 4,5-dimethyl-2-thiazolyl, 5-methyl-1,3,4-thiadiazolyl, 2-pyrazinyl, 2-pyrimidinyl, 1,2,4-triazin-2-yl, 2-pyridyl, 3-pyridyl, 4-pyridyl, 3-methyl-2-pyridyl, 4-methyl-2-pyridyl, 5-methyl-2-pyridyl, 6-methyl-2-pyridyl, 4,6-dimethyl-2-pyridyl, 5-isoxazolyl, 5-methyl-3-isoxazolyl, 3,4-dimethyl-5-isoxazolyl, 2,6-dimethyl-4-pyrimidinyl or 1,2,3,4-tetrazol-5-yl; a phenyl radical; or a phenyl radical substituted by halogen, hydroxy, lower alkyl, nitro, trifluoromethyl or lower alkoxy, and R_3 and R_4, independently, are hydrogen or lower alkyl,

or its tautomer or a pharmaceutically acceptable salt thereof.

4,090,021

PROCESS FOR THE PRODUCTION OF N[6]-SUBSTITUTED ADENOSINE NUCLEOTIDES AND PRODUCTS RESULTING THEREFROM

Helmut Vorbruggen, Berlin, Germany, assignor to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Continuation-in-part of Ser. No. 295,719, Oct. 6, 1972, Pat. No. 3,983,104. This application Aug. 27, 1975, Ser. No. 608,250

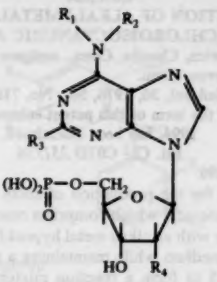
Claims priority, application Germany, Oct. 8, 1971, 2151013

The portion of the term of this patent subsequent to Sep. 28, 1993, has been disclaimed.

Int. Cl.[2] C07H *19/20*

U.S. Cl. 536—28 **13 Claims**

10. A compound of the formula



wherein R_1 and R_2 each are alkyl of 1 to 6 carbon atoms, monocyclic carbocyclic aralkyl or aryl of up to 10 carbon atoms which is unsubstituted or substituted by hydroxy or alkoxy of 1 to 4 carbon atoms, a heterocyclic ring of 4 to 7 ring members and containing a total of 1 to 3 nitrogen atoms or an oxygen or sulfur atom, or R_1 is a hydrogen atom and R_2 is as defined above or is hydroxy, amino or terminally substituted alkyl, or R_1 and R_2 collectively with the N-atom are a heterocyclic ring as defined hereinabove; R_3 is H or NH_2; and R_4 is H or OH.

4,090,022

POROUS CELLULOSE BEADS

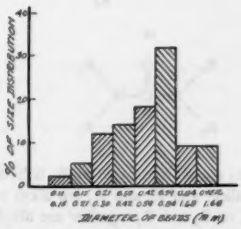
George T. Tsao, and Li Fu Chen, both of West Lafayette, Ind., assignors to Purdue Research Foundation, West Lafayette, Ind.

Continuation-in-part of Ser. No. 679,497, Apr. 22, 1976. This application Mar. 21, 1977, Ser. No. 779,950

The portion of the term of this patent subsequent to Dec. 13, 1994, has been disclaimed.

Int. Cl.[2] C08B *15/10, 16/00*

U.S. Cl. 536—57 **20 Claims**



1. A process for the preparation of porous cellulose beads suitable for use as a carrier of enzymes and other biological agents which comprises the steps of:

a. dissolving a hydrolyzable cellulose derivative in an inert organic, water-miscible solvent to form a solution having a density greater than that of a precipitation solution the cellulose derivative to solvent ratio ranging from 1:20 to 1:3 weight/volume;

b. distributing said solution in the form of droplets into a precipitation solution whereby said cellulose derivative is precipitated in the form of uniformly porous beads;

c. separating the precipitated beads from said solution;

d. washing the separated porous beads with water;

e. hydrolyzing the washed beads to convert the beads to cellulose and to increase the active sites for attachment of enzymes and other biological agents;

f. washing the hydrolyzed beads to obtain porous cellulose beads having a uniformly distributed void space greater than 50% by volume.

4,090,023

PRODUCTION OF ALKALI METAL SALTS OF DICHLOROISOCYANURIC ACID

John A. Wojtowicz, Chesire, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Jul. 30, 1976, Ser. No. 710,080
The portion of the term of this patent subsequent to May 17, 1994, has been disclaimed.
Int. Cl.[2] C07D *251/36*
U.S. Cl. 544—190 6 Claims

1. A process for the production of alkali metal salts of dichloroisocyanuric acid which comprises reacting a monoalkali metal cyanurate with an alkali metal hypochlorite and chlorine in an aqueous medium while maintaining a pH of from about 6.0 to about 7.5 to form a reaction mixture containing said alkali metal salt of dichloroisocyanuric acid and an alkali metal chloride, and recovering said alkali metal salt of dichloroisocyanuric acid.

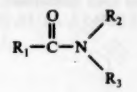
4,090,024

PROCESS FOR THE PRODUCTION OF SKATYLHYDANTOIN

Wolfgang Merk; Gerd Schreyer, and Horst Weigel, all of Hanau, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler, Frankfurt, Germany

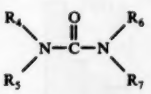
Filed Feb. 3, 1977, Ser. No. 765,425
Claims priority, application Germany, Feb. 7, 1976, 2604842
Int. Cl.[2] C07D *403/06*
U.S. Cl. 548—309 9 Claims

1. A process for the production of skatylhydantoin comprising hydrogenating indolalhydantoin employing a noble metal containing hydrogenation catalyst and a solvent or a mixture of solvents having the formula



(I)

or



(II)

where R_1 to R_3 are all hydrogen or R_1 is hydrogen or 1 to 6 carbon atom alkyl and R_2 and R_3 are alkyl of 1 to 8 carbon atoms or aryl, or R_2 and R_3 together are alkylene with 2 to 8 carbon atoms, or one of R_2 and R_3 is hydrogen or alkyl of 1 to 6 carbon atoms and R_1 and the other of R_2 and R_3 are joined to form an alkylene group with 2 to 8 carbon atoms, and

R_4 to R_7 are alkyl with 1 to 8 carbon atoms, aryl, alkaryl, or aralkyl or two of the substituents R_4 to R_7 together are alkylene with 2 to 8 carbon atoms, said solvent or mixture of solvents having a melting point below 50° C.

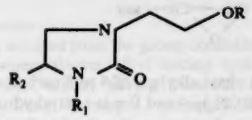
4,090,025

INTERMEDIATES FOR SYNTHESIS OF TETRAMISOLE, LEVAMISOLE AND THEIR DERIVATIVES

Sivaraman Raghu, Norwalk; Arthur Kentaro Hoffmann, New Canaan, and Balwant Singh, Stamford, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

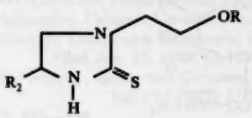
Continuation-in-part of Ser. No. 680,311, Apr. 26, 1973, abandoned. This application Nov. 8, 1976, Ser. No. 739,924
Int. Cl.[2] C07D *233/32, 233/38, 233/42*
U.S. Cl. 548—320 26 Claims

1. A compound of the formula:



wherein R is selected from the group consisting of hydrogen, C_1–C_6 alkyl, halo C_1–C_6 alkyl, phenyl, phenyl substituted with up to three groups selected from the group consisting of C_1–C_6 alkyl, halo and C_1–C_6 alkoxy and a moiety of the formula COR_3, wherein R_3 is selected from the group consisting of hydrogen, C_1–D_6 alkyl, C_1–C_6 alkoxy, phenoxy, halo C_1–C_6 alkyl, phenyl, and phenyl or phenoxy substituted with up to four groups selected from the group consisting of C_1–C_6 alkyl, halo, trifluoromethyl and C_1–C_6 alkoxy; R_1 is selected from the group consisting of hydrogen and a moiety of the formula COR_4, wherein R_4 is selected from the group consisting of C_1–C_6 alkyl, C_1–C_6 alkoxy, phenoxy, C_5–C_{10} cycloalkyl, phenyl and phenyl or phenoxy substituted with up to four groups selected from the group consisting of C_1–C_6 alkyl, C_1–C_6 alkoxy, halo and trifluoromethyl and R_2 is selected from the group consisting of phenyl and phenyl substituted with up to two groups selected from the group consisting of C_1–C_6 alkyl, C_1–C_6 alkoxy, halo and trifluoromethyl.

21. A compound of the formula:



wherein R is selected from the group consisting of C_1–C_6 alkyl, halo C_1–C_6 alkyl, phenyl, phenyl substituted with up to three groups from the group consisting of C_1–C_6 alkyl, halo and C_1–C_6 alkoxy; and R_2 is selected from the group consisting of phenyl and phenyl substituted with up to two groups selected from the group consisting of C_1–C_6 alkyl, C_1–C_6 alkoxy, halo and trifluoromethyl.

4,090,026

CERTAIN NITROGEN HETEROCYCLIC ISOTHIOCYANATE ESTERS

Graham John Durant; Charon Robin Ganellin, both of Welwyn Garden City, and George Raymond White, Harpenden, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Division of Ser. No. 603,881, Aug. 11, 1975, abandoned. This application Aug. 13, 1976, Ser. No. 714,210
Claims priority, application United Kingdom, Sep. 2, 1974, 38255/74
Int. Cl.[2] C07D *233/24, 213/53*
U.S. Cl. 548—342 2 Claims

1. A compound of the formula:

$$Het(CH_2)_m—Y—(CH_2)_n—N=C=S$$

wherein Het is imidazole, pyridine or triazole, which ring is

optionally substituted by lower alkyl, hydroxyl or halogen; *m* is 0, 1 or 2 and *n* is 2 or 3 provided that the sum of *m* and *n* is 3 or 4 and Y is oxygen or sulphur.

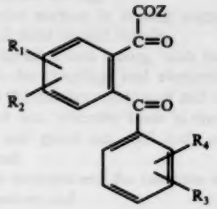
4,090,027

ISOINDOLE DERIVATIVES

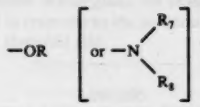
Roland Jaunin, Basel, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 633,514, Nov. 20, 1975, Pat. No. 3,996,374.
This application Aug. 25, 1976, Ser. No. 718,658
Int. Cl.[2] C07C *69/76*
U.S. Cl. 560—52 2 Claims

1. A compound of the formula



wherein Z is the group

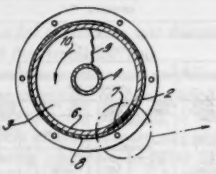


R is alkyl, cycloalkyl, cycloalkylalkyl, alkoxyalkyl, allyl or aralkyl, and R_1, R_2, R_3 and R_4, independently, are hydrogen, halogen, alkyl, alkoxy or trifluoromethyl.

4,090,028
METAL ARCING RING FOR HIGH VOLTAGE GAS-INSULATED BUS

Jürg Vontobel, Oberentfelden, Switzerland, assignor to Sprecher & Schuh Ltd. (SSA), Aarau, Switzerland

Filed May 19, 1977, Ser. No. 798,344
Claims priority, application Switzerland, Sep. 23, 1976, 12054/76
Int. Cl.[2] H01B *9/04*
U.S. Cl. 174—14 R 11 Claims

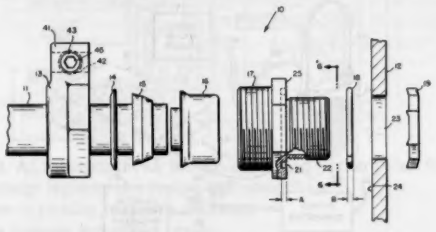


1. A metal arcing ring for a high voltage gas-insulated bus; said bus comprising an elongated central conductor, an outer conductive gas-filled housing surrounding said central conductor and extending coextensively therewith, a support insulator secured to said central conductor and supporting said central conductor within said housing; said metal arcing ring comprising an electrically conductive member fixed to the interior of said housing and adjacent said support insulator and having an arc receptive surface facing said central conductor; said electrically conductive member defining at least a portion of a current carrying turn around said central conductor for producing a magnetic field which has at least a component thereof in an axial direction to the axis of said housing; one end of said conductive member being electrically connected to said housing; the remainder of said member being electrically insulated from said housing.

4,090,029
LIQUID TIGHT CONNECTOR WITH IMPROVED GROUND CONDUCTIVITY

Russell Edgar Lundeberg, West Hartford, Conn., assignor to General Signal Corporation, Rochester, N.Y.

Filed Apr. 15, 1976, Ser. No. 677,460
Int. Cl.[2] H02G *3/06*
U.S. Cl. 174—51 8 Claims



1. An electrical fitting for attachment to an end of a flexible metal conduit, having a nonconducting liquid tight outer jacket, to provide parallel internal and external grounding connections and to facilitate coupling the conduit to a panel member and comprising in combination elements assembled in the named sequence:

(a) a gland nut having internal threads and an integral ground lug;

(b) a sealing ring;

(c) a one piece ferrule having threads on an internal sleeve and including,

(1) an outer sleeve having cylindrical sides and

(2) a flared lip engaging said sealing ring;

(d) a body member having,

(1) an interior surface in mating engagement with the cylindrical sides of said ferrule;

(2) a first threaded end mating with the threads of said gland nut for coupling said elements together in response to the relative rotation of said body member and said gland nut, whereby there is electrical continuity between said gland nut, said body member, and said ferrule; and

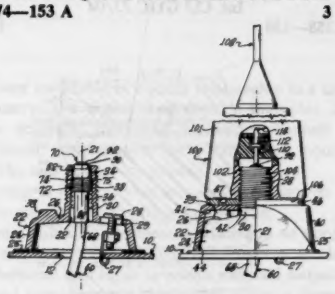
(3) a second threaded end for insertion in an opening in a panel member; and

(e) a lock nut on said second threaded end for coupling said fitting to a panel member whereby said ground lug on said gland nut may be oriented at any selected angular orientation in the plane of said gland nut as said fitting is secured to the panel in response to the rotation of said lock nut on said second threaded end.

4,090,030
ANTENNA MOUNT AND CONNECTOR

Eugene F. Lagasse, Chester, Conn., assignor to Conrac Corporation, New York, N.Y.

Filed Dec. 9, 1976, Ser. No. 749,090
Int. Cl.[2] H01Q *1/32, 1/12;* H01R *17/04, 17/20*
U.S. Cl. 174—153 A 3 Claims



1. Apparatus for mounting a whip antenna assembly on a panel member of a vehicle body at a mounting aperture in the panel member and for electrically connecting the antenna assembly to a radio transceiver or the like at a remote body position, said antenna assembly including coaxial mounting threads and a live electrical contact having an axially facing contact surface; said apparatus comprising

a bracket member having a through bore and including coaxial threads at the outer end of the bore for receiving said mounting threads to mount the antenna assembly, the bore having internal threads which open axially inward and are closed outwardly by an inwardly facing annular shoulder,

means actuable from outside said panel member for mounting the bracket member on the panel member with the inner end of the bore approximately aligned with the mounting aperture,

a flexible coaxial cable including an axial live conductor, an outer ground conductor, and a sheath of solid insulation between the conductors,

an electrical terminal fitting mounted on one end of the cable and comprising an externally threaded conductive ground terminal member surrounding the cable insulation sheath and electrically engaging the cable ground conductor, an annular dielectric support coaxially abutting the outer end of the ground terminal member, and a live terminal contact with axially facing contact surface directly connected electrically to the live cable conductor and mechanically supported independently of that conductor on the outer end of the dielectric support in positively de-

fined, axially spaced relation to the ground terminal member,

the threads of the ground terminal member being receivable in said internal threads of the bracket bore with the dielectric support engaging said annular shoulder to position the live terminal contact for directly engaging the live antenna contact upon mounting of an antenna assembly on the bracket member,

said terminal fitting having a maximum diameter approximating the cable diameter, whereby the cable and its mounted terminal fitting are readily fished from said remote body position through apertures in the vehicle body and through said mounting aperture in the panel member for screw threaded connection with an unmounted bracket member.

4,090,031

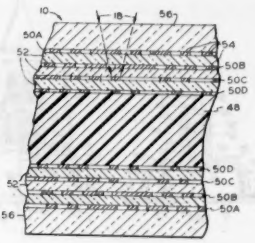
MULTI-LAYERED OPITCAL DATA RECORDS AND PLAYBACK APPARATUS

James T. Russell, Richland, Wash., assignor to Eli S. Jacobs, New York, N.Y.

Continuation of Ser. No. 516,453, Oct. 21, 1974, abandoned, which is a continuation-in-part of Ser. No. 375,336, Jul. 2, 1973, Pat. No. 3,891,794. This application Sep. 27, 1976, Ser. No. 727,369

Int. Cl.[2] G11C *13/04*

U.S. Cl. 358—130 **12 Claims**



1. A multi-layered optical data record comprising:

a base member including a first side and a second side separated by the thickness of said base member;

a plurality of optical data layers on said base member having optical data information spots recorded as a plurality of spaced data spots thereon, including first and second data layers of different data provided on the same side of at least one of said first and second sides of said base member;

said first and second data layers being contiguous so that corresponding surfaces of said layers are separated by a distance less than the thickness of said base member; and

said first and second data layers each having complete data recorded thereon so that only one data layer at a time is used to modulate readout light and thereby produce a readout signal of the data in said one layer.

4,090,032

CONTROL SYSTEM FOR AUDIO AMPLIFYING SYSTEM HAVING MULTIPLE MICROPHONES

Loren P. Schrader, Rockford, Ill., assignor to Wm. A. Holmin Corporation, Rockford, Ill.

Filed May 5, 1976, Ser. No. 683,309

Int. Cl.[2] H04M *3/56*; H04R *27/00*

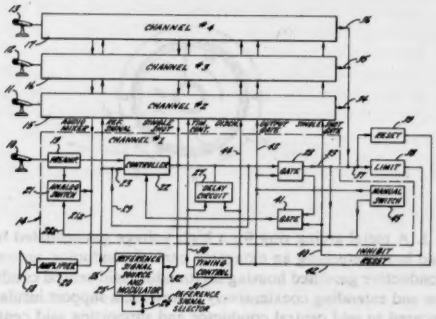
U.S. Cl. 179—1 CN **22 Claims**

1. A control system for an audio amplifying system having a plurality of microphones producing individual output signals, said control system comprising the combination of

(a) a plurality of switching means each of which is connected to one of said microphones for turning the respective microphones on and off,

(b) a plurality of control means each of which is connected to one of said microphones and is responsive to the individual output signal from one of said microphones for enabling the corresponding switching means to turn that microphone on in response to a microphone output signal above a predetermined threshold level,

(c) means for supplying a reference signal to each of said control means for establishing the threshold level at which said control means enables the corresponding switching means,



(d) and modulating means connected to said control means and responsive to the output signals from said control means connected to the microphones that are turned on for modulating said reference signal in accordance with the amplitude of the output signals of the microphones that are turned on, thereby automatically varying the threshold levels of said control means to avoid the enabling of said switching means in response to undesirable audio signals.

4,090,033

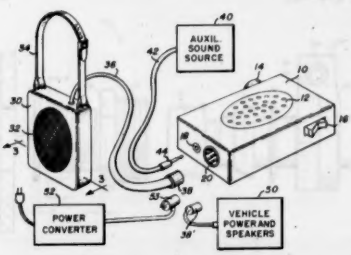
MINIATURE PORTABLE PUBLIC ADDRESS SYSTEM

Milton M. Silverstein, San Jose, Calif., assignor to J.M.J. Electronics, Inc., Berkeley, Calif.

Filed May 24, 1976, Ser. No. 689,259

Int. Cl.[2] H04R *27/00*

U.S. Cl. 179—1 AT **8 Claims**



1. In a motor bus including loud speakers mounted inside the bus, a sound amplifier connected to the speakers, and a DC power supply for providing electrical energy to the amplifier, an improved sound amplifier comprising:

a generally rectangular hand-held case having a plurality of first electrical connectors and a plurality of second electrical connectors;

transducer means contained within said case for converting sound waves into electrical impulses;

amplification means disposed within said case and connected to said transducer means for developing an amplified signal from the electtical impulses, said amplifier means

also being connected to said first electrical connectors and including a first transistor and a second transistor in Darlington configuration, and a power amplifier to develop said amplified signal;

cable means for connecting said first electrical connectors to the bus's loud speakers and for connecting said second electrical connectors with the bus's power supply;

first switch means for connecting said amplification means to said second electrical connectors to allow electric current to flow from the bus's power supply to said amplification means;

second switch means for connecting said transducer means to the base of said first transistor; and

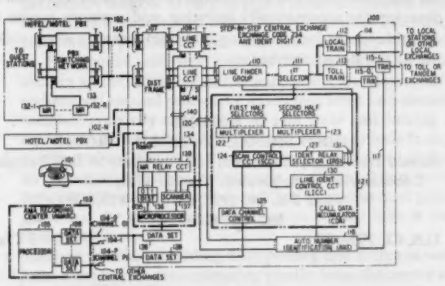
volume control means connected to said amplification means for determining the magnitude of the amplified signal, said volume control means being mounted to said case and protruding therefrom so as to be externally accessible said sound amplifier being operative to cause sound waves contacting said transducer means to be amplified and broadcast over the motor bus loud speakers.

4,090,034

USAGE-SENSITIVE BILLING ARRANGEMENT FOR PRIVATE BRANCH EXCHANGE SUBSCRIBERS

Philip John Moylan, Genoa Township, Delaware County, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jun. 9, 1977, Ser. No. 805,119
Int. Cl.[2] H04M *15/12*
U.S. Cl. 179—7.1 R **13 Claims**



1. An arrangement for providing message register pulses for ıessage registers at a remote site, comprising

an orginating telephone exchange,

a message accounting center,

pulsing means associated with the message registers,

means at the exchange for identifying trunks routing incoming calls from the remote site to the exchange,

means for receiving trunk identification information from the identifying means and dialed digits from an incoming trunk and for forwarding the identification information and the dialed digits to the accounting center, and

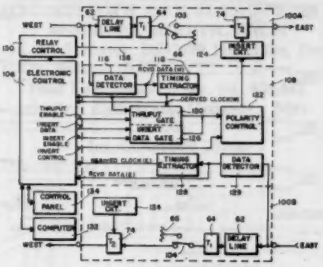
means at the accounting center for translating the identification information and the dialed digits into message register pulsing information and for forwarding the pulsing information to the pulsing means, wherein the pulsing means has means for transmitting pulses to a message register at the remote site in accordance with the pulsing information.

4,090,035

LINE ACCESS MODULE

Philip Popkin, Orange County, Fla., assignor to Martin Marietta Corporation, Orlando, Fla.

Continuation-in-part of Ser. No. 641,712, Dec. 17, 1975, abandoned. This application Sep. 21, 1976, Ser. No. 725,308
Int. Cl.[2] H04J *3/08*
U.S. Cl. 179—15 BO **18 Claims**



8. A device installable in a series relationship in a transmission line carrying a digital time division multiplex data bit stream for accessing individual subscriber channels within such bit stream, which device has a transparent mode and a bypass mode, said device comprising:

input terminals for receiving incoming data signals;

output terminals for outputting data signals;

switch means having an operated state and an unoperated state, said switch means being connected in an electrical path between said input terminals and said output terminals and providing in a transparent mode, a through-put path for incoming data signals when said switch means is in said unoperated state, and providing in a bypass mode, an interruption of said throughput path when said switch means is in said operated state;

delay means disposed in said electrical path between said input terminals and said switch means, said delay means for delaying the passage of such incoming data signals through said throughput path only when said switch means is in said unoperated state,

said switch means connected to resistively terminate said delay means when said switch means is in said operated state

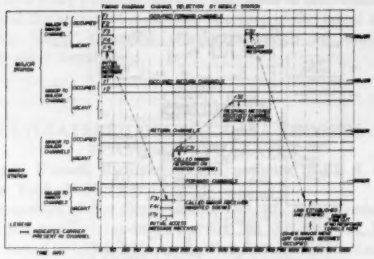
monitoring means electrically connected to said input terminals for passing incoming data signals to external signal processing circuits only when said switch means is in said operated state; and

data insertion means electrically connected to said output terminals and to said external signal processing circuits for receiving outgoing data signals from said external signal processing circuits, said data insertion means passing said outgoing data signals to said output terminals when said switch means is in said operated state wherein at least some portions of said outgoing data signals are identical to at least some portions of said incoming data signals, said delay means having a selected delay time to cause the transit time of incoming data signals through said throughput path when said switch means is in said unoperated state to be exactly equal to the transit time of said identical portions of incoming data signals through said monitoring means, said external signal processing circuits, and said data insertion means when said switch means is in said operated state.

4,090,036
SATELLITE COMMUNICATIONS SYSTEM

Michael A. Stott, Ottawa, and Russell J. Campbell, Kanata, both of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Ottawa, Canada

Filed Jan. 27, 1977, Ser. No. 763,207
Claims priority, application Canada, Feb. 9, 1976, 245305
Int. Cl.[2] H04J 3/12
U.S. Cl. 179—15 BY **6 Claims**



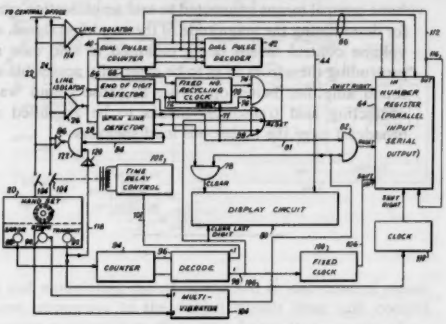
1. A satellite communications system comprising:
a plurality of minor stations;
at least one major station for providing communication links with said minor stations through a plurality of forward and return channels;
said major station comprising:
first carrier detection means for detecting the presence of carrier waves on said return channels and for selecting those of said forward channels which are carrier free;
means for simultaneously transmitting a modulated carrier forward signal in the form of an access request signal on each of said selected carrier-free forward channels; and
means for receiving a modulated carrier return signal on any of said return channels; and
said minor station comprising;
second carrier detection means for detecting the presence of a carrier wave on any of said forward channels;
means for causing said second carrier detection means to hunt through said forward channels one at a time until said second carrier detection means detects one of said forward channels which is carrier free;
means for detecting said forward signal on said one of said forward channels;
means responsive to said forward signal for transmitting said return signal on one of said carrier-free return channels; and means responsive to said forward signal for temporarily inhibiting reception on said one of said forward channels for a predetermined period of time sufficient to enable establishment of a communications link between said major and minor stations, whereby detection of a different access request signal by said minor station is prevented;
said means for transmitting the forward signal comprising means for transmitting the access request signal with a first address code identifying the respective one of said minor stations and a second address code identifying said major station, and said means for transmitting said return signal comprising means for transmitting a response signal including the first and second address codes.

4,090,037
TELEPHONE SET

Jack W. Benjamin, 257-27 149th Rd., Rosedale, N.Y. 11422, and Samson Helfgott, 611 Caffrey Ave., Far Rockaway, N.Y. 11691

Filed Sep. 15, 1975, Ser. No. 613,087
Int. Cl.[2] H04M 1/44
U.S. Cl. 179—90 AN **10 Claims**

1. An attachment for a conventional telephone circuit that is directly coupled to a telephone line, comprising, housing means, numeric optical display means contained in said housing means, control circuit means in said housing means responsive to numbers entered onto the telephone circuit and controlling said display means to optically display the numbers entered and including open line detector means for detecting the state of said line, coupling means electrically connecting said control circuit means between said telephone circuit and the telephone line without physically disconnecting the telephone circuit from the telephone line, and memory means coupled to said control circuit means for storing the numbers entered onto the telephone circuit as they are being displayed, and wherein

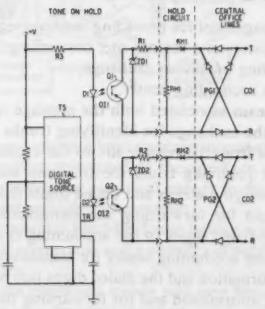


said control circuit means prevents the transmission of numbers from said telephone circuit directly onto the telephone line, said memory and display means storing and displaying the numbers entered onto the telephone circuit prior to their being transmitted onto the telephone line, and wherein said control circuit means also includes means under subscriber control coupled to said memory means for controlling the transmission of the stored numerical digits from said memory means onto the telephone line and reset means responsive to said open line detector for automatically resetting said memory means and override means for overriding said reset means to allow redialling of the stored number.

4,090,038
AUDIO SIGNAL ON HOLD CIRCUIT

Ronald Dee Biggs, Zionsville, Ind., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jul. 14, 1977, Ser. No. 815,569
Int. Cl.[2] H04M 1/72
U.S. Cl. 179—99 **5 Claims**



1. An audio signal on hold circuit for use with a hold bridge including an impedance that is connected across an associated

telephone line when the line is placed on hold, the circuit comprising;

an audio source;

a light emitting diode connected to the audio source and energized responsive thereto; and

the combination of a phototransistor optically coupled to the light emitting diode and an impedance connected in series with the phototransistor, the combination adapted to be connected in parallel with the hold bridge impedance, whereby the current flowing through the hold bridge impedance when the line is placed on hold is modulated by the current flow through the impedance in series with the phototransistor responsive to the signal output of the audio source to provide a corresponding audio signal to the line.

4,090,039

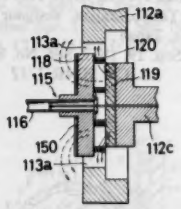
ELECTRODYNAMIC TRANSDUCER

Yoshihisa Mori, Tokyo, and Kazuo Shimura, Hatogaya, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 6, 1976, Ser. No. 702,608

Int. Cl.² H04R *9/16*

U.S. Cl. 179—100.41 D **3 Claims**



1. An electrodynamic transducer for stereo signals comprising:

magnetic means for generating a dense and substantially constant magnetic flux, said magnetic means including a permanent magnet having opposed poles at opposite ends thereof, first and second plate-shaped members extending substantially parallel to each other from said opposite ends of the magnet, said first member having a circular hole therein and constituting a first pole-piece, and a generally rod-shaped second pole-piece extending from said second member coaxially in respect to said hole and having a circular end face of smaller diameter than said hole facing axially toward the latter from outside said hole to define an annular gap across which the magnetic flux travels between the axially directed end face of said second pole-piece and the radially directed margin of said hole in the first pole-piece;

a vibrating member including a supporting disc fitting in said hole, a cantilever arm extending axially from the center of said supporting disc, and a stylus at the free end of said arm;

connecting means for connecting said vibrating member to said second pole-piece including an elastic damper member interposed between said supporting disc and said end face of the second pole-piece so that said vibrating member is pivotally movable about a center of oscillation in the region of said damper member;

said supporting disc having symmetrically arranged first and second pairs of diametrically opposed projections extending from a face of said disc at right angles to each other and having radially outer and inner edge portions disposed so that said magnetic flux predominantly passes through said outer edge portions; and

first and second coils including respective turns wrapped around said first and second pairs, respectively, of the projections on said supporting disc with said turns of each of said coils being wound in opposite directions about the respective pair of projections and being connected in series, and with the portions of said turns of the coils on said radially outer edge portions of the respective projections being primarily effective for linkage with said flux between said first and second pole pieces.

4,090,040

HEARING AID WITH ACOUSTICAL FREQUENCY RESPONSE MODIFICATION

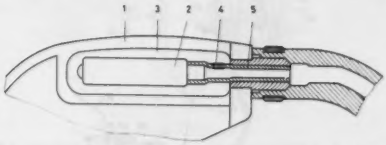
Ole Berland, 32 Syrenvej, DK-2970 Horsholm, Denmark, assignor to Ole Berland, Denmark

Filed May 27, 1977, Ser. No. 801,141

Claims priority, application Germany, May 31, 1976, 7617377[U]

Int. Cl.² H04R *25/00*

U.S. Cl. 179—107 FD **4 Claims**



1. A hearing aid for persons who are hard of hearing, comprising a sound receiver, amplifier, and sound reproducer, to which conduit for delivering sound is connected, characterized in that one or more openings disposed within the housing lead from the interior of the conduit to a cavity which surrounds the sound reproducer.

4,090,041

ELECTROMAGNETIC SONIC GENERATOR FOR AN ALARM

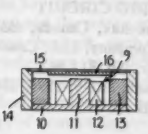
Shigeo Mori; Fumikazu Murakami; Yoshiaki Hara; Ichiro Horikoshi, and Souya Takahashi, all of Tokyo, Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

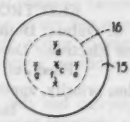
Filed Dec. 23, 1976, Ser. No. 753,849

Claims priority, application Japan, Dec. 24, 1975, 50-154297

Int. Cl.² H04R *11/02*

U.S. Cl. 179—115 R **2 Claims**





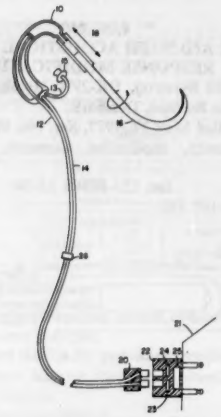
1. An electro-acoustic transducer for an alarm generator of the electromagnetic type comprising an exciting part which comprises a magnetic core and an exciting coil wound on said core, a vibrating plate mounted opposite to said magnetic core of said exciting part in spaced relation to said magnetic core and a thin plate of ferromagnetic material provided on the surface of said vibrating plate on the side thereof facing said magnetic core, said thin plate being smaller than said vibrating plate and being secured to said vibrating plate by welding at a plurality of spaced points more than three.

4,090,042

ACOUSTICAL COMMUNICATIONS HEADSET

Wallace Keith Larkin, Soquel, Calif., assignor to Kayce, Inc., Aptos, Calif.

Continuation-in-part of Ser. No. 561,473, Mar. 24, 1975, Pat. No. 3,993,879. This application Mar. 18, 1976, Ser. No. 667,989
The portion of the term of this patent subsequent to Nov. 23, 1993, has been disclaimed.
Int. Cl.[2] H04M *1/05*
U.S. Cl. 179—156 A **11 Claims**



1. A non-electrical, acoustical communications headset for use remote from communications equipment, said headset comprising:

means for mounting the headset on the head of the user, a flexible transmitter tube supported by the mounting means having one end adjustably adapted for positioning near the user's mouth for conducting sound therefrom and the other end terminating in a coupling adapted to releasably connect to communications equipment remote from the user's head,

a flexible receiver tube supported by the mounting means having one end positioned in the user's ear for conducting sound thereto and the other end terminating in a coupling adapted to releasably connect to communications equipment remote from the user's head, said communications equipment including amplifying means communicating with the receiver tube and a microphone communicating with the transmitter tube.

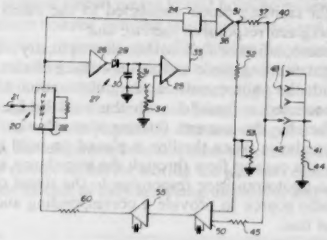
4,090,043

ELECTRONIC HYBRID CIRCUIT

David B. Oulton, Dollard des Ormeaux, Canada, assignor to Pylon Electronic Development Company, Ltd., Canada

Filed Jul. 1, 1977, Ser. No. 812,362
Claims priority, application Canada, Jul. 9, 1976, 256711
Int. Cl.[2] H04B *1/58*
U.S. Cl. 179—170 NC **3 Claims**

1. An electronic hybrid circuit comprising a local input and output means and a system input and output means, said local input means being connected to an analog switch and to a comparator, said comparator providing a control voltage to turn on said analog switch if a signal on said local input exceeds a predetermined minimum, said analog switch having an output connected to an amplifier which, in turn, feeds two parallel branches connected as inputs to a differential amplifier, one parallel branch including a high resistance in series with the system input and output means and the other parallel branch including an adjustable voltage divider whereby the input signal levels to the differential amplifier may be made equal for signals originating from the local input and output means, said



differential amplifier having an output connected, via an amplitude limited amplifier, to said local input and output means.

4,090,044

CONTAINER FOR POSITIONING A DISINFECTANT-IMPREGNATED MEMBER IN A TELEPHONE MOUTHPIECE

Masao Kaneyasu, Tokyo, Japan, assignor to Dentsu Central Kabushiki Kaisha, Japan

Filed Sep. 19, 1977, Ser. No. 834,669
Int. Cl.[2] H04R *1/12*
U.S. Cl. 179—185 **4 Claims**

1. A container for a disinfectant-impregnated member which is positionable in a telephone mouthpiece, the container comprising

a container body having a bottom portion for supporting the disinfectant-impregnated member thereon and an annular outer frame connected to said bottom portion, said bottom portion defining a central circular opening therein and said annular outer frame being concentric with said central circular opening;

a substantially flat, circular lid member having a substantially reticulated structure and of sufficient size to cover said bottom portion of said container body, including said central circular opening;

said lid member including at least two prongs projecting from one of the substantially flat surfaces thereof and positioned so as to extend through said central opening of said container body when said lid member is fitted in said container body, said prongs being capable of fitting into perforations in a telephone mouthpiece, said lid member also including a plurality of circumferentially, equi-angularly spaced, triangular teeth having their apexes directed radially outwardly of the lid member, said triangular teeth respectively having a slow slope portion and a steep slope portion; and,

said container body including a plurality of upper retaining pieces provided in the outer frame thereof in equi-angularly spaced relation so as to leave cut-away portions between each pair of retaining pieces, said retaining pieces being equal in number to the number of triangular teeth on said lid member; a plurality of small projections positioned

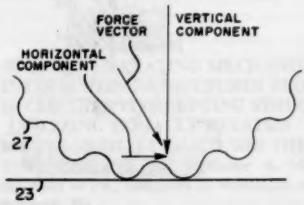
under said upper retaining pieces and capable of engaging the slow slope portions of associated triangular teeth of said lid member when said lid member is positioned in said container body and rotated in one direction, thereby impeding the rotation of said lid member in said one direction relative to said container body; and a plurality of associated triangular pawls provided on the inner circumferential surface of said outer annular frame and below said upper retaining pieces and having their apexes directed radially inwardly of said container body, said triangular pawls having a slow slope portion and a steep slope portion, and said steep slope portion of respective pawls being capable of engaging the steep slope portion of associated triangular teeth of said lid member, thereby preventing the rotation of said lid member in a direction opposite said one direction, relative to said container body.

4,090,045

KEYBOARD STRIP SWITCH ASSEMBLY HAVING MULTIFURCATED CONDUCTIVE SCREEN CONTACT WITH CONTACT CLEANING WIPING-ACTION

Richard E. Marsh, West Chicago, Ill., assignor to Marsh Products, Inc., Batavia, Ill.

Continuation of Ser. No. 640,748, Dec. 15, 1975, abandoned.
This application Apr. 1, 1977, Ser. No. 783,684
Int. Cl.[2] H01H *13/70, 1/18*
U.S. Cl. 200—5 A **2 Claims**



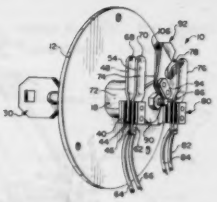
1. An electrical switch array adapted to be actuable such as by finger pressure comprising a plurality of individual electrical switches for effecting selected electrical connections to an associated electrical or electronic curcuitry comprising, in combination, a base of non-conductive material, conductive material formed as a planar surface on said base to provide discrete stationary contacts, flexible conductive screen material means positioned adjacent said stationary contacts, resilient means having apertures corresponding to the stationary contacts positioned intermediate said screen material and said formed material to provide a spacing therebetween, a flexible film positioned over said screen material and having indicia thereon corresponding to respective contact areas, areas of said film and said screen material being selectively actuable from an initial position against said conductive material for providing a multifurcated electrical contact with high pressure over a small area with at least one selected stationary contact, said flexible screen material when actuated by finger pressure also providing a horizontal component of movement on said stationary contact to effect a wiping and cleaning action thereto whereby good electrical contact characteristics are obtained between said flexible screen material and said resilient means tending to restore the moved area of said film and said flexible screen material to their initial position.

4,090,046

KEY OPERATED SWITCH FOR AUTOMOBILE ALARM OR THE LIKE

James H. Faust, Cicero, and Billy J. Biagioli, Chicago, both of Ill., assignors to A.B.C. Auto Alarms, Inc., Forest Park, Ill.

Filed Jun. 20, 1977, Ser. No. 808,167
Int. Cl.[2] H01H *27/06*
U.S. Cl. 200—44 **9 Claims**



1. An electric key-operated switch adapted to be mounted on a structure for controlling an alarm or the like having two electrical circuits, said switch comprising:

A. means for mounting a lock on said structure, said lock having a fixed part and a rotary part adapted to rotate on an axis between two positions angularly spaced from one another less than a full revolution, the lock being actuated by a key that rotates in the fixed part between the two positions relative thereto and is removable from the lock at said positions only,

B. the rotary part having a rotor mounted thereon at a location radially spaced from the axis comprising

i. an irregular geometric configuration metal structure insulatedly connected with the rotary part and insulated from the fixed part,

ii. the metal of the rotor being resilient and having a central generally radially extending slot serving to divide at least the radially outward part of the rotor into two blades,

iii. the blades being laterally deformed out of plane of rotation of the rotor and the blades being respectively at circumferential ends of the rotor, each blade presenting itself as a leading edge of the rotor when the rotor is rotated in one direction,

iv. the rotor adapted to move in an arcuate path simultaneously with the rotation of the key and being driven by the key, there being a mechanical coupling between the key and the rotary part when the proper key is inserted into the lock, such arcuate path acting to carry the blades into two different respective positions at the opposite ends of said path,

C. a bracket mounted on the fixed part and carrying two pairs of contact fingers spaced apart at locations, respectively which intersect the arcuate paths at said opposite ends thereof, each pair of fingers comprising:

i. juxtaposed resilient metal members normally spaced apart when a blade is not interposed between them,

ii. said metal members having their peripheries outwardly flared to provide pilot means for the entry of a blade,

iii. the fingers being mounted on said bracket insulatingly, and

iv. said fingers having means for electrically connecting them into an electrical circuit which is adapted to be open when the blade is not engaged between the fingers but closed when a blade is disposed between the fingers,

D. the movement of the rotor from one position to the other being effective to withdraw one blade from one pair of fingers as it starts the movement and to force the other blade to enter between the other pair of fingers as it completes the movement, the withdrawal being complete before the entry is commenced, and

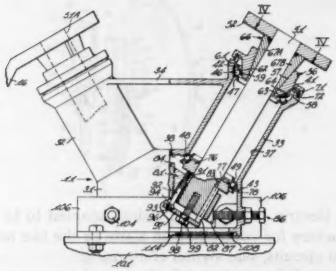
E. the lock having stop means carried by the fixed and rotary parts defining the path of movement of the rotor.

4,090,047

CENTER BREAK DISCONNECT SWITCH ASSEMBLY

Matthew L. Worrix, Sheridan, Oreg., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Sep. 10, 1976, Ser. No. 722,108
Int. Cl.[2] H01H *31/00*
U.S. Cl. 200—48 P **5 Claims**



1. In a high voltage center break switch:

an integrally casted hollow metallic base presenting a pair of hollow spindle housings which extend upwardly in a common plane and away from each other, said spindle housings being identical;

antifriction bearings operably disposed in opposite ends of each of said spindle housings;

antifriction bearing seats in said spindle housings casted integrally with said base and operable as casted to receive said antifriction bearings;

a spindle journalled in the bearings associated with each spindle housing;

adjustable means operably connected to each of said spindles for preloading the associated antifriction bearings;

openings casted integrally with said base and adapted as casted to receive bolts for securing said base to supporting structure, said bolt openings including casted bolt head retaining recesses adapted as cast to receive and hold the heads of the bolts received in said opening to restrain the bolts against rotation;

a perimeter recess integrally cast with said base in the bottom edge surface thereof and adapted as casted to receive a closure plate; and,

a closure plate having at least one vent operably secured in said perimeter recess to seal the said base to prevent animals and debris from entering into the interior of said hollow base.

4,090,048

DIFFERENTIAL PRESSURE ACTUATED SWITCH WITH CONTACT ON DIAPHRAGM

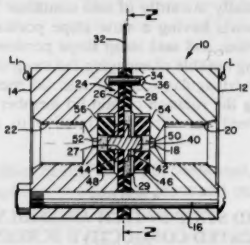
Alvin Brightman, 2449 Overlook Rd. #4, Cleveland Heights, Ohio 44106

Filed Aug. 6, 1976, Ser. No. 712,349
Int. Cl.[2] H01H *35/34*
U.S. Cl. 200—83 N **9 Claims**

1. A pressure actuated switch comprising a frame means forming an enclosed chamber having a pressure fluid inlet connecting thereto,

a flexible diaphragm supported at its periphery by said frame means and having a center area extending across said chamber to separate it into a first chamber connecting to said fluid inlet and a second chamber,

a member of flowable plastic positioned in and only partly filling said second chamber, said member being adjacent to one face of said diaphragm and being deformed by movement of said diaphragm towards an end of said second chamber formed by said frame means,



a contact means on said diaphragm and movable to operatively contact said frame means by deflection of said diaphragm against the deformation resistance of said member by pressure differential between said chambers, and

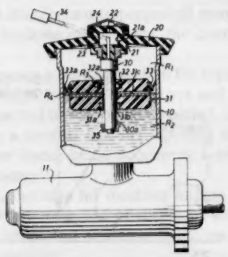
connection means connecting to said contact means and extending from said frame to form a terminal of said switch.

4,090,049

SEALED RESERVOIR FOR BRAKE MASTER CYLINDER

Tomoyuki Nogami, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jul. 27, 1976, Ser. No. 709,184
Claims priority, application Japan, Aug. 14, 1975, 50-98864
Int. Cl.[2] H01H *35/18*
U.S. Cl. 200—84 C **7 Claims**



1. A fluid reservoir adapted for mounting on a brake master cylinder, comprising:

a casing for storing an amount of brake fluid, said casing having an opening in the top thereof;

a sealing cap detachably secured in said opening to seal the interior of said casing;

a float arranged in said casing for vertical movement in response to variations in fluid level in said casing, said float subdividing said casing into upper and lower compartments, said float being provided at the center thereof with an aperture;

a first check valve secured to the outer periphery of said float and slidably engaged with the inner wall of said casing to permit only flow of air into either of said upper or lower compartment; and

a second check valve secured to the center of said float to

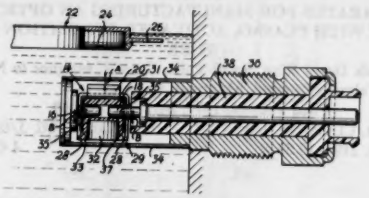
permit only the air flowing through the aperture into either the lower or upper compartment.

4,090,050

ELECTRO-MECHANICAL LIQUID LEVEL SENSOR

Hemming G. Siiberg, Summit, N.J., assignor to Wagner Electric Corporation, Parsippany, N.J.

Filed Sep. 20, 1976, Ser. No. 725,101
Int. Cl.[2] H01H *35/18*
U.S. Cl. 200—84 C **9 Claims**



1. A liquid level indicator comprising:
(a) a container for a liquid;
(b) a switch housing disposed in the container at a level below normal liquid level height, the interior of said switch housing being liquidly isolated from said container and said switch housing including:
(i) a pair of spaced contacts;
(ii) an electrically conductive member operable between a first position wherein it is spaced from the contacts and a second position wherein it engages the contacts and closed a circuit;
(iii) a magnet affixed to said electrically conductive member;
(c) a float assembly adapted for floating at the top of liquid in said container, said float assembly including a magnetically attractable material;
(d) said magnetic being attracted to the magnetically attractable material when the liquid level reaches a predetermined level whereby the electrically conductive member is urged into engagement with the pair of contacts; and
(e) the force of attraction between the magnet and the magnetically attractable material being greater than the buoyant force of the float assembly in the liquid.

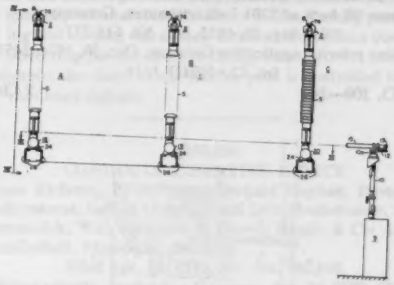
4,090,051

ENERGY-STORAGE OPERATING MECHANISMS FOR CIRCUIT-INTERRUPTING STRUCTURES ALONE AND ALSO FOR CIRCUIT-INTERRUPTING STRUCTURES UTILIZING SERIALLY-RELATED DISCONNECTING-SWITCH STRUCTURES THEREWITH

Russell E. Frink, Pittsburgh, and Stanislaw A. Milianowicz, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 14, 1974, Ser. No. 469,931
Int. Cl.[2] H01H *9/54, 33/00*
U.S. Cl. 200—144 R **47 Claims**

1. A circuit-interrupter including separable contact means separable to establish arcing between the contacts, an operating mechanism for effecting the closing and opening movements of said separable contact means comprising releasable energy-storing means, a movable operating member, means for translating the motion of said movable operating member into an increase of the energy content stored within said energy-storing means, a toggle-linkage having a pair of interconnected toggle-links and a releasable knee-pin interconnecting said toggle links, said toggle-linkage interconnecting said releasable energy-storing means with said separable contact means, biasing means for biasing the separable contacts to the open position, first releasing means for said releasable knee-pin, tripping means for effecting release of said first releasing means to release the releasable knee-pin to thereby effect collapse of the toggle-linkage and effect the opening of the separable contacts, second releasing means for discharging the stored-energy of



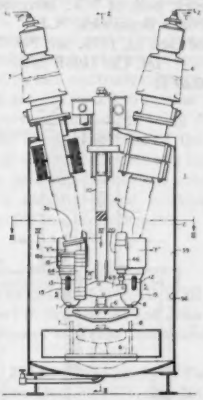
said energy-storage means to effect the straightening of said toggle-linkage and consequent closing of the separable contacts.

4,090,052

TANK-TYPE OIL CIRCUIT-INTERRUPTER WITH JET FORCES COUNTERBALANCING THE MAGNETIC FORCES

Charles W. Tragesser, Murrysville; Ronald E. Vaill, Penn Township, Westmoreland County; Richard J. Bohinc, Hempfield Township, Westmoreland County, and Francis R. Racki, O'Hara Township, Allegheny County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 27, 1976, Ser. No. 680,630
Int. Cl.[2] H01H *33/68*
U.S. Cl. 200—150 R **14 Claims**



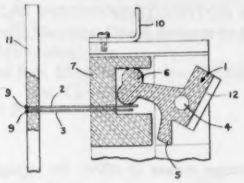
1. A circuit-interrupter of the oil-break type including means defining an arc-extinguishing grid-unit, stationary contact means disposed adjacent the upper end of said grid-unit, a movable rod-shaped movable contact movable downwardly away from said relatively-stationary contact to establish an arc within the oil, a pair of laterally-spaced venting ports (**12, 13**) disposed in the side walls of the arc-extinguishing grid-unit only on one side of said grid-unit, and the angle of divergence between said two laterally-spaced venting ports having a divergence angle in the range from between 80° and 160°.

4,090,053

SPRING CONTACT SWITCH ASSEMBLY

Anton Schaumann, Reuteberg 81, and Willi Weber, Borisriedstrasse 10, both of 7701 Volkertshausen, Germany

Filed Sep. 25, 1975, Ser. No. 616,772
Claims priority, application Germany, Oct. 30, 1974, 2451611
Int. Cl.² H01H *1/14*
U.S. Cl. 200—241 **7 Claims**



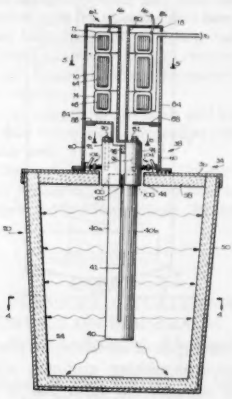
1. A keyswitch comprising a circuit board **11**, first and second elongated contact members (**2, 3**) cantilever mounted in said circuit board, said members being parallel to and spaced from each other, the free end of one of said members being transversely bent, at least one of said members being resilient, a control rail (**7**) provided with an opening through which extend said contact members, said control rail being cut out to provide a recessed region in which terminate the free ends of said contact members, a key button (**1**), means for pivotably mounting said key button adjacent said control rail, and said key button having a profiled actuating end (**6**) extending within said recessed region and resting against the resilient contact member while the other contact member rests against a wall of the cutout portion of said control rail whereby when said key button is depressed the profiled actuating end thereof wipingly urges said resilient contact member against said other contact member.

4,090,054

ELECTRICAL PREHEATING APPARATUS

Hans Gunther Heine, Little Silver, and Otto Hochstrasser, North Brunswick, both of N.J., assignors to Brown Boveri Corporation, North Brunswick, N.J.

Filed Oct. 12, 1976, Ser. No. 731,748
Int. Cl.² H05B *5/00*
U.S. Cl. 219—10.49 R **8 Claims**



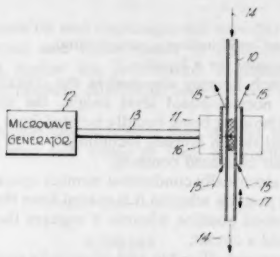
1. Apparatus for use in preheating a ladle, said apparatus comprising a transformer having a single turn secondary winding formed as the outer shell of the transformer, said winding having a pair of closely spaced output terminals, a pair of clamping and contact heads attached, respectively, to said outer shell at said output terminals, an elongated graphite bar having an elongated slot extending from one end toward, but short of, the other end thereof to divide the bar into a pair of closely spaced parallel elements integrally connected together at said other end, an electrically insulative spacer between said elements at said one end of said bar, said elements at said one end of said bar being positioned between and contacted by said clamping and contact elements and means associated with said clamping and contact elements for forcing them toward each other to clamp said one end of said bar between them.

4,090,055

APPARATUS FOR MANUFACTURING AN OPTICAL FIBRE WITH PLASMA ACTIVATED DEPOSITION IN A TUBE

Frederick David King, Smith Falls, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Feb. 14, 1977, Ser. No. 768,068
Int. Cl.² H05B *9/06*; C03C *25/02*; C03B *25/00, 5/02*
U.S. Cl. 219—10.55 R **4 Claims**



1. Apparatus for manufacturing an optical fibre having fused silica layers, comprising:

a microwave cavity and means for applying a microwave field to said cavity;

support means for supporting a fused silica tube in said cavity and means for traversing said tube axially in said cavity;

means for supplying a mixture of gases to a fused silica tube supported in said support means for passage of said mixture of gases through said tube, said mixture of gases comprising a carrier gas, oxygen and a reactant gas comprising a gaseous form of the material to form said fused layers; and

means for supplying a cooling medium for passage along the outside of a fused silica tube supported in said support means;

the arrangement such that said microwave field can produce ionization of at least one of said oxygen and said reactant gas to form a plasma in said tube and produce a temperature of at least 1000° C on the inside wall of the tube whereby a fused layer of said material is formed on said inner wall.

4,090,056

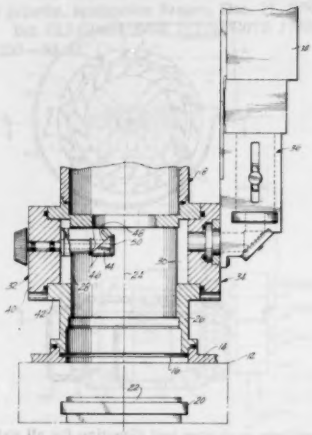
OPTICAL VIEWING SYSTEM FOR AN ELECTRON BEAM WELDER

Herbert C. Lockwood, Chino, and Salvatore M. Robelotto, Torrance, both of Calif., assignors to Electron Beam Welding, Inc., Los Angeles, Calif.

Filed May 17, 1976, Ser. No. 687,163
Int. Cl.² B23K *9/00*
U.S. Cl. 219—121 EB **8 Claims**

1. In an electron beam welding device having a vacuum chamber in which an electron gun directs a beam of electrons at a work piece, an optical system for viewing the point of impact of the beam with the work piece comprising a prism, means for supporting the prism in the vacuum chamber to one

side of and closely adjacent to the path of the electron beam, the prism having a first surface extending substantially perpendicular to the electron beam, a strip of transparent plastic material having a portion extending across said first surface of the prism, means for moving the strip lengthwise across said



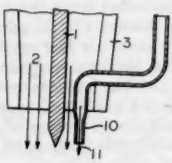
prism surface, an open mesh conductive screen positioned adjacent said first surface of the prism for at least partially shielding the prism from infrared radiation, and means conducting static electric charge from the screen and strip, the strip passing between the screen and the prism surface.

4,090,057

METHOD FOR CONTROLLING THE SHAPE OF A MOLTEN POOL IN GAS SHIELD ARC WELDING

Akira Okada, Tokyo, Japan, assignor to National Research Institute for Metals, Tokyo, Japan

Filed Sep. 17, 1976, Ser. No. 724,229
Claims priority, application Japan, Sep. 18, 1975, 50-112060
Int. Cl.[2] B23K 9/00
U.S. Cl. 219—122 **9 Claims**



1. In a method of gas shield arc welding a metal workpiece with a gas shield arc welding torch which includes a shield gas nozzle surrounding a metal electrode wherein welding is performed while a shield gas flows from the shield gas nozzle and surrounds the arc generated between the electrode and the metal workpiece, said arc locally melting and gouging the metal workpiece, whereby a molten pool of molten metal gathers in said gouging,

the improvement comprising,

providing a control gas nozzle in parallel with the axis of said electrode in the space between said electrode and the inner wall of said shield gas nozzle, said control gas nozzle being located in said space at a position which is rearward of said electrode with regard to the welding direction, said control gas nozzle having a tip whose gas flow outlet opens toward the molten pool during welding; and

performing gas shield arc welding while applying a control gas stream, through said control gas nozzle, at a pressure higher than the pressure of said shield gas, to the surface of said molten pool rearward of the position at which the molten pool attains its maximum width, thereby pressurizing and cooling the molten metal in said molten pool and deflecting the arc in the welding direction.

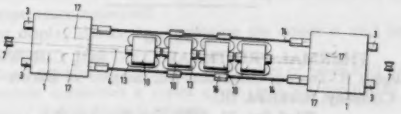
whereby the shape of the molten pool is controlled to prevent bead defects.

4,090,058

CONDUCTIVE HEATING DEVICE

Werner Kielhorn, Essen-Steele; Gerhard Heyduk, Dortmund-Scharnhorst, both of Germany, and Otto Hochstrasser, North Brunswick, N.J., assignors to Brown, Boveri & Cie Aktiengesellschaft, Mannheim, Germany

Filed Apr. 26, 1976, Ser. No. 680,046
Claims priority, application Germany, Apr. 26, 1975, 2518664
Int. Cl.[2] C21D 9/62
U.S. Cl. 219—156 **3 Claims**



1. In apparatus for resistance-heating elongated workpieces by direct passage of current therethrough, a device for displacing the elongated workpieces longitudinally into and out of the apparatus comprising rail means providing a transporting surface into and out of the apparatus, electrode carriers having rollers rollably supporting said electrode carriers on said rail means, and drive means for driving said electrode carriers along said rail means in axial direction of a respective workpiece, a plurality of serially disposed transformers of equal power rating formed with respective windows having centers disposed on an axis coinciding with the longitudinal axis of a workpiece when the latter is being resistance-heated in the apparatus, said transformers having primary windings on opposite legs thereof, the workpiece extending through said windows of said transformers and being connected at the ends thereof to said transformers by electrodes engaging said workpiece and supported by said electrode carriers, flexible conductor elements which are connected to tubular current conductors, said tubular current conductors being disposed substantially parallel to the longitudinal axis of the workpiece and being located outside said transformers at a minimal proximate distance therefrom, said tubular current conductors, flexible conductor elements, electrodes and workpiece constituting secondary windings for said transformers.

4,090,059

THERMAL RECORDING HEAD FOR PRINTER

Jack S. Kilby; Robert F. Schweitzer, and John McCrady, all of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 254,668, May 18, 1972, Pat. No. 3,944,724.
This application Oct. 20, 1975, Ser. No. 624,240
Int. Cl.[3] H05B 1/00
U.S. Cl. 219—216 **4 Claims**

1. A thermal printhead consisting essentially of:

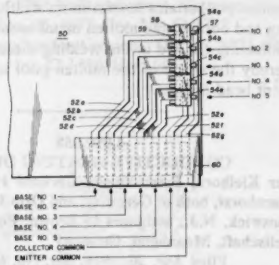
a substrate,

a plurality of conductors formed on one surface of the substrate, and

a line of separate heating elements each comprising a monolithic semiconductor chip having circuit means for heating the respective element when energized and having beam leads extending beyond the periphery of said chip parallel to the face of said chip,

the heating elements being fastened on said one surface of

the substrate with said beam leads adjacent said one surface of said substrate and with each said beam lead of each



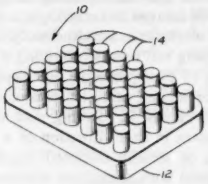
element bonded to a conductor on the substrate at locations outside the peripheries of said chips.

4,090,060

THERMAL PRINTHEAD CONTROL CIRCUIT

Eugene R. Jornod, Caledonia, Ill., assignor to Barber-Colman Company, Rockford, Ill.

Filed Jan. 31, 1977, Ser. No. 764,217
Int. Cl.[2] H05B *1/00*
U.S. Cl. 219—216 **16 Claims**



1. A thermal printhead circuit comprising: a plurality of heating elements, a plurality of first selecting terminals fewer in number than said heating elements, and a plurality of second selecting terminals fewer in number than said heating elements, each of said second selecting terminals coupled to at least one of said first selecting terminals through a respective one of said heating elements, and each of said heating elements connected between a single first selecting terminal and a single second selecting terminal; a first power terminal; a second power terminal; first means for selectively coupling at least one of said first selecting terminals to said first power terminal; second means for selectively coupling at least one of said second selecting terminals to said second power terminal; and a current diverter connected in parallel to a series circuit comprising one of said heating elements and one of said selective coupling means connected together by one of said first and second selecting terminals.

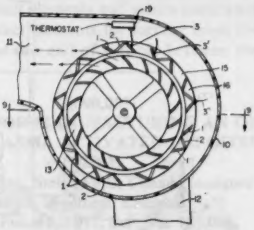
4,090,061

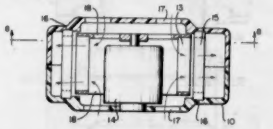
ELECTRIC AIR-HEATER UNIT UTILIZING A CENTRIFUGAL IMPELLER

Dov Zeev Glucksman, 43 Norwood Ave., Newton, Mass. 02159

Filed Mar. 1, 1976, Ser. No. 662,807
Claims priority, application Israel, Mar. 9, 1975, 46779
Int. Cl.[2] H05B *1/00*; F24H *3/04*; A45D *20/10*
U.S. Cl. 219—369 **6 Claims**

1. An apparatus for heating and delivering air comprising a bladed, centrifugal impeller rotatable about an axis and an electric heating element in the shape of a stationary cylindrical cage of spaced longitudinal air guide vanes made of an electric resistance alloy, said cage being substantially coextensive in height with the width of the impeller and being positioned so as to surround said impeller in peripheral, spaced concentric alignment, said guide vanes being in the shape of strips of uniform width extending substantially parallel to the longitudinal axis of the cage, the surface of each strip being inclined in respect of the ideal cylindrical surface of the cage, the inclination being uniform in degree and direction for all strips of the cage, means being provided for electrically energizing the said guide vanes for heating said vanes to a temperature adequate for heating the air passing through the impeller and the guide vanes and means for rotating the impeller to cause air to flow through the air guide vanes of the cage.



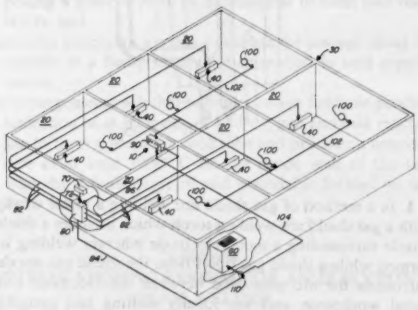


4,090,062

ENERGY DEMAND CONTROLLER AND METHOD THEREFOR

Alvin Carson Phillips, Aurora, and James Stephen Cumbach, Denver, both of Colo., assignors to Phillips Control Corp., Denver, Colo.

Filed Jul. 12, 1976, Ser. No. 704,184
Int. Cl.[2] H05B *3/02*
U.S. Cl. 219—486 **26 Claims**



1. An energy demand controller for allocating electrical power consumption between a first plurality of users and a second plurality of users, said controller comprising:

means receptive of said electrical power for sequentially delivering said electrical power to each requesting one of said first plurality of users, and

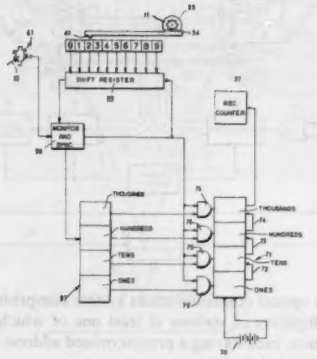
means responsive to a predetermined number of said plurality of second users using said electrical power for preventing said sequential delivery of power to said first users.

4,090,063

FRANKING MACHINE COMPRISING AN ELECTRONIC COUNTING SYSTEM

Claude Raymond Martin, Saint Germain en Laye, France, assignor to Societe d'Etude et de Construction d'Appareils de Precision (S.E.C.A.P.), Asnieres, France

Filed Dec. 2, 1976, Ser. No. 746,712
Claims priority, application France, Dec. 11, 1975, 75 37911
Int. Cl.[2] G06M *3/08, 1/274;* G07B *17/02*
U.S. Cl. 235—92 AC 5 Claims



1. A mail franking machine comprising:

printing means including a rotatable printing drum, adjustable printing elements mounted on said drum operable to permit a selected franking value;

a manually operated mechanism connected to said printing elements for setting said printing elements to the selected franking value including value-adjusting elements each corresponding to a respective printing element and transmission elements connecting each value-adjusting element to the corresponding printing element;

means for totalizing the franking values and recording the total of such values, in which machine the improvement comprises: said totalizing means comprising electronic means for recording at least a predetermined number of lower-order digits of said total including pick-up means for sensing the positions of said transmission elements relative to the corresponding printing elements and delivering an electrical signal indicating said positions; electronic processing circuits connected to said pick-up means to produce from said electrical signal a further signal indicative of said franking value; and an electronic recording counter for recording said further signal,

said pick-up means comprising a single row of ten sensing elements for selective and successive actuation of said transmission elements on each revolution of said printing drum;

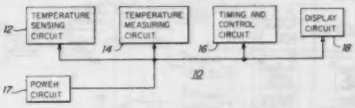
said processing circuit including: a shift register having parallel inputs each connected to a respective one of said sensing elements and a ten-bit series output; a pulse generator having a controlled output for delivering a series of pulses equal in number to the value set on a printing element upon actuation of the sensing elements by the corresponding transmission element; a pulse transmitter on said printing drum having an output for indicating the rotational position of said drum; a synchronizing circuit having an input connected to said pulse transmitter output, said synchronizing circuit having an output; an order counter connected to said synchronizing circuit output for adopting a state synchronized with the rotation of said printing drum; and a decade counter having a plurality of stages each having a carry connection with the next higher-order stage, each stage having a counting input selectively connectible to said pulse generator output in dependence upon the state of said order counter; said recording counter being connected to said carry connection of the highest-order state of said decade counter.

4,090,064

ELECTRONIC THERMOMETER DECODER AND DISPLAY SYSTEM

Robert B. Turner, Weymouth, Mass., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Jan. 12, 1977, Ser. No. 758,620
Int. Cl.[2] H03K *21/22;* G06M *3/08*
U.S. Cl. 235—92 MT 7 Claims



1. An electronic thermometer system for measuring and displaying temperature comprising:

a first counter for counting pulses representative of the temperature measured;

a first display device for displaying the count in said first counter;

a second counter for counting the number of times said first counter completes a count cycle, and for producing a binary coded decimal output;

a second display device;

a third display device; and

a count modifying circuit interconnected between said second counter and said second and third displays responsive to a first predetermined count in said second counter for indicating a first modified pre-established count for display by said second display device and responsive to a second predetermined count in said second counter for indicating a second modified pre-established count for display by said second display device and a third modified pre-established count for display by said third display device, wherein said count modifying circuit includes (i) means for connecting the zero order output of said second counter to the zero order input of said second display device, (ii) an exclusive-OR circuit having two inputs, a first input of said exclusive-OR circuit being connected to the first order output of said second counter and the output of said exclusive-OR circuit being connected to the first order input of said second display device, (iii) an AND-circuit having two inputs, one input of said AND-circuit being connected to the zero order output of said second counter and the other input of said AND-circuit being connected to the first order output of said second counter, the output of said AND-circuit being connected to the third order input of said second display device and to the second input of said exclusive-OR circuit; and (iv) means for connecting the second order output of said second counter to said third display device, said second order input of said second display device being set permanently to binary zero.

4,090,065

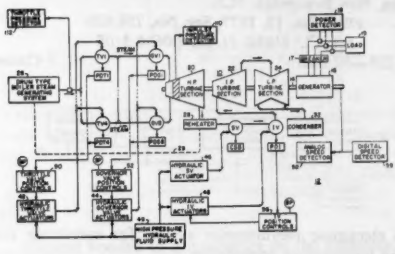
SYSTEM AND METHOD FOR OPERATING A STEAM TURBINE WITH PROTECTION PROVISIONS FOR A VALVE POSITIONING CONTINGENCY

Andrew Braytenbah, Pennsauken, N.J., and Leaman Podolsky, Wilmington, Del., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 247,853, Apr. 26, 1972, abandoned.
This application Oct. 5, 1973, Ser. No. 404,057
Int. Cl.[2] G05B *15/00;* F01D *17/02*
U.S. Cl. 364—494 19 Claims

6. A steam turbine system comprising a plurality of turbine sections, a predetermined arrangement of throttle and governor valves, said throttle and governor valves disposed to con-

trol the flow of steam from a steam generating system to the turbine, a control system having an automatic speed/load control for generating desired valve position signals and a backup speed/load control for generating desired valve position signals, means for selectively applying the automatic or backup desired position signals to position said valves, means



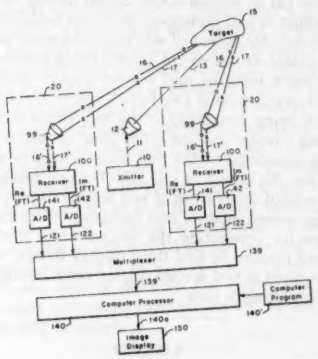
for responding to said automatic control to cause said backup control to track its desired valve position signals to the corresponding desired valve position signals from said automatic control, means for comparing the corresponding backup and automatic desired valve position signals, and means for generating a contingency output if any comparison difference exceeds a predetermined value.

4,090,066

POLARIZATION REFERENCE IMAGING SYSTEM

Thomas R. O'Meara, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 22, 1976, Ser. No. 679,302
Int. Cl.² H04B 9/00
U.S. Cl. 250—199 **7 Claims**



1. A polarization reference imaging system for detection of a target, comprising in combination:

transmitting means for electromagnetically illuminating the target;

a matrix of receiving means electromagnetically coupled to the target for receiving energy reflected as signals from illumination of the target substantially devoid of atmospheric distortion components, each said receiving means providing a different weighting factor for the received signals; and

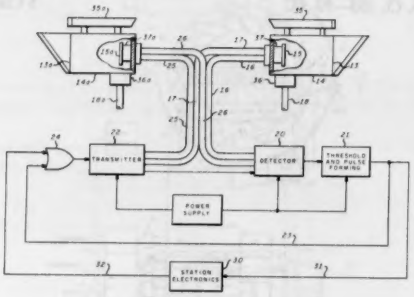
digital means connected to the receiving means.

4,090,067

OPTICAL DATA COMMUNICATION SYSTEM

William W. Bell, III, Bayside; Lamar Cox, Hempstead, and William L. Rubin, Whitestone, all of N.Y., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Nov. 2, 1976, Ser. No. 737,863
Int. Cl.² H04B 9/00
U.S. Cl. 250—199 **11 Claims**



1. An optical communications system comprising:

a multiplicity of stations at least one of which is a master station, each having a predetermined address coded signal designated thereto:

means at each of said stations for coupling said stations to stations adjacent thereto;

means remotely located from said coupling means at each of said stations for generating optical signals for transmission to said adjacent stations in response to an optical signal received from one of said adjacent stations, and for generating electrical signals when said predetermined address coded signal is received; and

an optical fiber bundle wherein optical fibers are interleaved to couple optical signals received at said coupling means from adjacent stations to said receiver-generator means and to couple signals from said receiver-generator means to said coupling means for transmission to adjacent stations.

4,090,068

PROCESS FOR THE AUTOMATIC ADJUSTMENT OF SEMICONDUCTOR WAFERS

Dietrich Widmann, Unterhaching, and Johann Binder, Unterpfaffenhofen, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jul. 26, 1976, Ser. No. 709,129
Claims priority, application Germany, Sep. 3, 1975, 2539206
Int. Cl.² G01J 1/20
U.S. Cl. 250—201 **10 Claims**

1. A method for the automatic adjustment of layered substrates including semiconductor wafers comprising the steps of:

(a) arranging at least four adjustment patterns on a surface of the substrate, each of the adjustment patterns having a plurality of adjustment recesses;

(b) emitting convergent light from a condenser through a transparent body onto an applied mask to be adjusted, said mask having adjustment patterns;

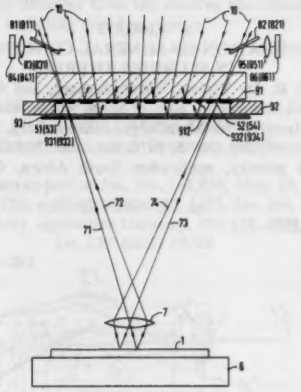
(c) providing a shutter having apertures at positions corresponding to said adjustment patterns to ensure that only light beams which pass through the adjustment patterns hit the surface of the substrate;

(d) projecting light beams passing through the adjustment patterns with an objective so that said light beams hit the surface of the substrate and are reflected back through the objective, shutter apertures, and adjustment patterns, on

the mask said light beams not being reflected when they hit said adjustment recesses on the substrate;

(e) deflecting the reflected back beams onto light sensitive elements; and

(f) controlling motors with the signals of said light sensitive elements to translate the transparent body with applied



mask in the *x* and *y* directions of a coordinate system and to rotate the transparent body by an angle ϕ in said coordinate system to align the adjustment patterns of the mask with respect to the adjustment patterns on the substrate so that a minimum of light is received by said light sensitive elements.

4,090,069

SEMI-AUTOMATIC COARSE-FINE FOCUSING APPARATUS FOR MICROSCOPES

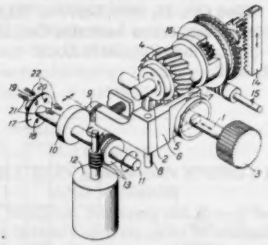
Robert Lisfeld, Ulmtal, Ulm; Werner Nickel, Sinn, Dillkreis, and Guenter Reinheimer, Biebertal, all of Germany, assignors to Ernst Leitz Wetzlar GmbH., Wetzlar, Germany

Filed Jun. 16, 1977, Ser. No. 807,143

Claims priority, application Germany, Jun. 18, 1976, 2627486

Int. Cl.² G01J *1/20*

U.S. Cl. 250—201 **9 Claims**



1. A coarse-fine focusing apparatus for a microscope whereby the apparatus adjusts the focus of the microscope through rotation of a shaft, comprising:

a gear for driving said shaft;

a helix meshed with said gear for turning said gear; said helix rigidly connected to a cylinder having an axis for rotating said cylinder about said axis and for reciprocating said cylinder along said axis, whereby the helix rotates the gear both as the cylinder rotates and as the cylinder reciprocates;

means for rotating the helix to provide for coarse adjustment of focus;

means for reciprocating the helix independently of rotating the helix to provide for fine adjustment of focus;

means for generating control signals; and

motor means, controlled by said control signals, for driving said reciprocating means.

4,090,070

SOLAR POINTER

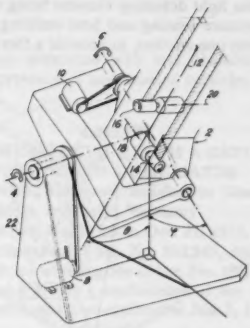
Jacques Colomés, Palaiseau, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 17, 1977, Ser. No. 778,609

Claims priority, application France, Mar. 26, 1976, 76 08829

Int. Cl.² G01J *1/20*

U.S. Cl. 250—203 R **9 Claims**



1. A solar pointer which is capable of pivoting about two perpendicular axes, each pivotal movement being controlled by a motor, wherein said pointer comprises two pyrheliometers for carrying out in each case periodic scanning in a plane at right angles to one of the two pivotal axes aforesaid, each pyrheliometer being provided with a receiving unit which rotates about an axis at right angles to the scanning plane and being associated with means for measuring the angular difference between the direction of the sun projected on the scanning plane and the direction of the pointing axis projected on said plane and for delivering an electrical pointing error signal which is proportional to said angular difference, said error signal being applied to the motor which serves to drive the pointer in pivotal motion about the axis located at right angles to the scanning plane in order to cancel said error signal and cause the two directions to coincide in the scanning plane, the pointing axis of the pointer being then directed towards the sun when the two error signals have thus been cancelled.

4,090,071

PHOTOMETRIC INSTRUMENT WITH THERMOELECTRIC CONTROL OF A PHOTOVOLTAIC SEMICONDUCTOR DETECTOR

Craig A. McCarter, Old Greenwich, Conn., assignor to Hoffman Engineering Corporation, Old Greenwich, Conn.

Filed Jun. 10, 1976, Ser. No. 694,648

Int. Cl.² H01J *7/24*

U.S. Cl. 250—238 **2 Claims**

1. A standard instrument for generating a stable calibrated quantity of radiant energy to be used such as in the testing and calibration of photometric instruments, the standard instruments being characterized by:

a standard source of radiant energy;

a calibration probe for accurately monitoring the radiant energy output of the standard source including:

a photovoltaic silicon light detecting element arranged to receive radiant energy emitted from the standard source upon a sensitive surface thereof and to emit an electrical signal related to the incident radiant energy;

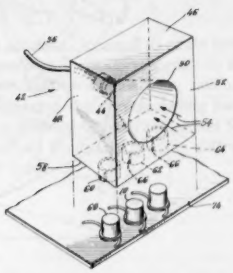
a thermally conductive block member mounting the photovoltaic silicon light detecting element;

temperature sensing means mounted on the thermally conductive block member and being in thermal communication with the silicon light detecting element along a continuous path through the conductive block member;

controllable heat emitting means mounted on the thermally conductive block member and being in thermal communication with the temperature sensing means and silicon light detecting element along continuous paths through the conductive block member;

a feedback circuit responsive to the temperature sensing means for controlling the heat emitting means to maintain the conductive block member and the silicon light detecting element at a constant temperature; and

the silicon light detecting element being spaced from the temperature sensing and heat emitting means, located adjacent one another, to provide a thermal lag through



the conductive block member to smooth out temperature fluctuations and thereby maintain the silicon light detecting element at a substantially invariant temperature; and

an electrical meter for indicating the magnitude of the electrical signal emitted by the light detecting element and for thereby accurately indicating the output of the standard source of radiant energy; and

means on the standard source of radiant energy for adjusting its output, whereby a standard radiant energy value, as measured by the calibration probe and electrical meter, may be obtained with great accuracy,

whereby the relationship between incident radiant energy from the standard source and electrical signal output of the light detecting element remains substantially invariant and the calibration probe can accurately monitor the output of the standard source to maintain its calibrated value.

4,090,072

METHOD FOR DETERMINATION OF ECONOMICALLY INTERESTING METALS IN CONTENT OF MANGANESE NODULES

Walfried Michaelis, Seevetal; Agmar Müller, Kroppels-hagen; Hans Ulrich Fanger, Reinbek, and Rudolf Pepelnik, Bornsen, all of Germany, assignors to Gesellschaft fur Kernenergie in Schiffbau u. Schiffahrt mbH, Geesthacht-Tesperhude, Germany

Filed Jun. 28, 1976, Ser. No. 700,129

Claims priority, application Germany, Jul. 5, 1975, 2530146

Int. Cl.² G01V *5/00*

U.S. Cl. 250—255 **9 Claims**

1. A method for determining the absolute content of economically interesting metals such as copper and nickel in manganese nodules, comprising the following steps:

(a) irradiating manganese nodule samples with essentially fast neutrons excluding interaction with thermal neutrons;

(b) recording the activation gamma-ray spectrum;

(c) taking from the gamma-ray spectrum of the irradiated sample the ratio of radiation intensities of two main components, preferably manganese and iron; and

(d) determining from this ratio, via empirically obtained geochemical correlational information between the concentration ratio of two main elements and the present fractions of further elements, the absolute percent concentration of metals, not directly disclosed in the spectrum.

4,090,073

DETERMINATION OF MINERAL CONCENTRATIONS IN SLURRIES THEREOF

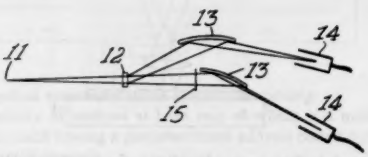
Johan P. R. De Villiers, Johnannesburg, and George T. W. Ormrod, Randburgh, both of South Africa, assignors to National Institute for Metallurgy, Johannesburg, South Africa

Filed Oct. 5, 1976, Ser. No. 729,862

Claims priority, application South Africa, Oct. 8, 1975, 75/6387

Int. Cl.² G01N *23/20*

U.S. Cl. 250—273 **11 Claims**



9. A method for the x-ray diffraction determination of the concentration of predetermined minerals in slurries, said method comprising presenting a sample in the form of a stream of slurry having areas of two opposing sides thereof unsupported by any boundry walls therefor, and making required determinations through the unsupported areas of the stream of slurry using the transmitted geometry of the x-ray diffraction technique employing x-radiation of a wavelength shorter than 1, 392 A, said x-ray diffraction method providing an improved signal to background noise ratio.

4,090,074

ANALYSIS OF COAL

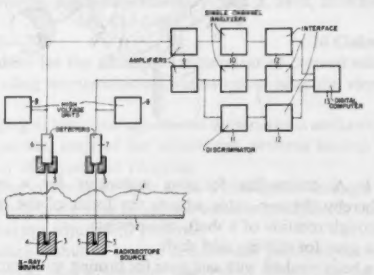
John Stanley Watt, Heathcote, and Vilis Leonids Gravitis, Revesby, both of Australia, assignors to Australian Atomic Energy Commission, Coogee, Australia

Filed Oct. 15, 1976, Ser. No. 732,644

Claims priority, application Australia, Oct. 29, 1975, 3760/75

Int. Cl.² G01N *23/20*

U.S. Cl. 250—273 **15 Claims**



1. A method of analyzing coal or coke comprising determining the concentration of ash or mineral matter in coal or coke by the steps comprising (i) measuring the transmission or scatter of X-rays or γ-rays of a first energy chosen such that there is significant difference in absorption of radiation per unit weight in coal matter and mineral matter excluding iron, in

combination with (ii) effecting at least one further measurement of transmission or scatter of X-rays or γ-rays at a different energy so chosen that there is a significant difference in absorption of radiation per unit weight of coal matter and mineral matter and that the relative absorption per unit weights by said coal matter and said mineral matter at any one energy is significantly different from the relative absorption at each other energy including said first energy.

4,090,075

METHOD AND APPARATUS FOR MASS ANALYSIS BY MULTI-POLE MASS FILTERS

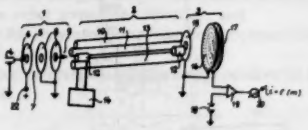
Uwe Hans Werner Brinkmann, Benquestr. 29, Bremen, Germany

Continuation-in-part of Ser. No. 122,899, Mar. 10, 1971, abandoned. This application Oct. 23, 1975, Ser. No. 624,746

Claims priority, application Germany, Mar. 17, 1970, 2012479

Int. Cl.[2] B01D *59/44*

U.S. Cl. 250—282 **4 Claims**



1. A method of mass analysis by ionization and mass separation which method includes the steps of,

ionizing molecules of a substance to be analysed,

establishing a high frequency electric field with a quadrupole filter having opposed pairs of poles receiving a field voltage symmetrically disposed about an axis parallel to the poles to selectively establish stable and unstable trajectories of the ions of the ionized molecules associated with working points at the marginal zone of a stability diagram having a lower stability limit related to a predetermined cutoff mass,

performing a scanning operation on the ion beam transmitted by the quadrupole filter by varying the field voltage thereby shifting the lower stability limit towards higher or lower masses and thereby imparting increased energy to those ions substantially of that cutoff mass,

and subjecting the transmitted ions to an energy discriminating procedure thus indicating or filtering only the current of ions of increased energy of said predetermined cutoff mass as a function of said field voltage.

4,090,076

HIGH RESOLUTION ELECTRON ENERGY DEVICE AND METHOD

Heinrich Erwin Hunziker, Saratoga, and Robert Kenyon Nesbet, Los Gatos, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 16, 1976, Ser. No. 705,982

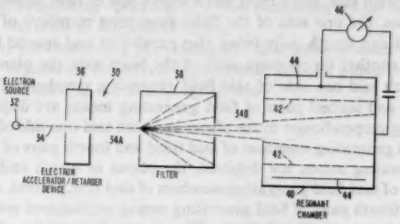
Int. Cl.[2] H01J *39/00*

U.S. Cl. 250—305 **14 Claims**

1. An electron spectrometer adapted to analyze the kinetic energy of electrons emitted from a sample comprising

first means for varying the energy value of electrons from said sample to bring the energy value of said electrons to a range which includes the energy value of the resonance of a detector gas,

a resonance chamber associated with said first means containing a detector gas adapted to exhibit a narrow scattering resonance at a specific energy value wherein said narrow resonance of said detector gas filters the electron energy spectrum in the vicinity of said specific energy value to emit particles resulting from the scattering process, and



detector means associated with said chamber adapted to detect the presence of said emitted particles.

4,090,077

PARTICLE BEAM DEVICE WITH A DEFLECTION SYSTEM AND A STIGMATOR

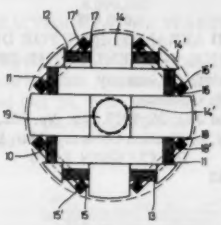
Klaus Anger, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation of Ser. No. 516,600, Oct. 21, 1974, abandoned, which is a continuation of Ser. No. 382,545, Jul. 25, 1973, abandoned, which is a continuation of Ser. No. 198,586, Nov. 15, 1971, abandoned, which is a continuation of Ser. No. 15,461, Mar. 2, 1970, abandoned. This application Jan. 5, 1976, Ser. No. 646,669

Claims priority, application Germany, Mar. 5, 1969, 1912235

Int. Cl.[2] H01J *37/26*

U.S. Cl. 250—311 **1 Claim**



1. In combination in a charged particle beam device having a beam generator, means for directing a beam from the generator along a beam axis and a plurality of deflecting stages, respectively disposed at different locations along the beam axis from the beam generator, a device for eliminating deflection errors disposed at the location of one of said plurality of deflection stages closest to the beam generator, said one deflecting stage comprising a plurality of deflection systems including a first and a second deflection member each having respective sides disposed in mutually parallel planes on opposite sides of the beam axis, and a third and a fourth deflection member each having respective sides also disposed in mutually parallel planes on opposite sides of the beam axis, the planes in which said sides of said first and second deflection members are disposed being perpendicular to the planes in which said sides of said third and fourth deflection members are disposed, said device for eliminating deflection errors comprising a stigmator having at least four pairs of field generating means, each of said four pairs respectively having two mutually adjacent field generating members with at least one side thereof parallel to one another, said one side of each of said two mutually adjacent field generating members being disposed in mutually parallel planes located on the same side of the beam axis, said four pairs of field generating means including a first and a second pair, the one side of the field generating members of

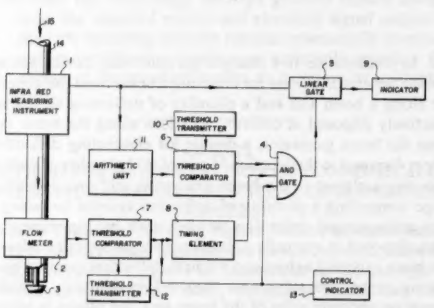
said first and second pairs of field generating means being parallel to and spaced from one another on opposite sides of the beam axis, and a third and a fourth pair of field generating means, the one side of the field generating members of said third and fourth pairs being also parallel to and spaced from one another on opposite sides of the beam axis, the planes in which said one side of said field generating members of said first and second pairs of field generating means are disposed being perpendicular to the planes in which said one side of said field generating members of said third and fourth pairs of field generating means are disposed, the planes in which said one side of said field generating members of said first, second, third and fourth pairs of field generating means are disposed extending at an angle of 45° to the planes in which said sides of said first, second, third and fourth deflection members are disposed, and all of said first, second, third and fourth deflection members and said field generating member of said first, second, third and fourth pairs of field generating means having a common sectional plane extending perpendicularly to the beam axis and perpendicularly to said planes in which said sides of said first, second, third and fourth deflection members and said one side of said field generating members of said first, second, third and fourth pairs of field generating means are disposed said device further including circuit means connected to said deflection systems for supplying thereto an excitation current controlled by an excitation voltage, said circuit means including ancillary means for supplying said stigmator with an adjusting current proportional to the square of said excitation voltage, said circuit means including additional means for supplying to one of said deflection systems an adjusting current proportional to the third power of said excitation voltage.

4,090,078

METHOD AND ARRANGEMENT FOR DETERMINING ALCOHOL CONTENT IN THE BREATH

Ulrich Heim, Reinfeld, Germany, assignor to Dragerwerk Aktiengesellschaft, Germany

Filed Jan. 26, 1977, Ser. No. 762,807
Claims priority, application Germany, Mar. 13, 1976, 2610578
Int. Cl.² G01N *21/26*
U.S. Cl. 250—343 **8 Claims**



1. A method for determining the alcohol content, in exhalation air of a person, comprising the steps of passing the exhalation air through an alcohol measuring instrument, determining the alcohol concentration in the exhalation air, and providing an alcohol concentration output signal which increases to a plateau; measuring the flow velocity of the exhalation air passing through the measuring instrument; and, when the time variation of the alcohol concentration signal $S(t)$ relative to the magnitude of the alcohol concentration signal is below a predetermined threshold value

$$\frac{1}{S(t)} \cdot \frac{dS}{dt} \leq w$$

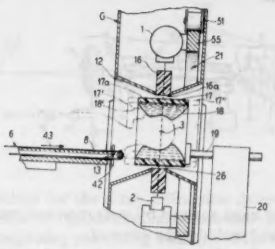
and when the flow velocity v of the exhalation air is above a predetermined value and has been maintained thereabove for a predetermined time t, transmitting the determined value of the alcohol concentration signal to an indicator.

4,090,079

MEDICAL EXAMINING APPARATUS FOR THE PRODUCTION OF TRANSVERSE SECTIONAL IMAGES

Peter Grassmann, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 24, 1977, Ser. No. 761,597
Claims priority, application Germany, Feb. 18, 1976, 2606534
Int. Cl.² A61B *6/00, 6/02;* G01N *23/00*
U.S. Cl. 250—360 **4 Claims**



1. Medical examining apparatus for obtaining transverse sectional images, comprising a ray measuring arrangement for generating a bundle of rays which penetrate a body segment and which scan the region of a selected transverse section of such body segment over a sufficient number of angularly offset ray paths through the region so that radiation received during the scanning of the region can be converted into signals defining a sectional image, a housing containing a compensating body comprising tissue-equivalent material for forming part of the ray path and having a patient-receiving through-aperture such that a patient may be moved relative to the ray measuring arrangement for selecting the region to be scanned, and means comprising a patient support movable with respect to a longitudinal axis of such patient-receiving through-aperture operable for moving a patient into and through said through-aperture so as to align any desired body segment of the patient with the ray measuring arrangement, the improvement comprising a holder assembly having a contouring member for filling with a liquid medium so as to conform with and firmly engage the head of a patient, and a supporting structure for mounting the holder assembly within the patient-receiving through-aperture, said supporting structure accommodating the removal of the holder assembly out of said patient-receiving through-aperture to accommodate scanning of a body part of a patient more nearly approximating the size of said patient-receiving aperture.

4,090,080

IMAGING

Christopher H. Tosswill, Sturbridge, Mass., assignor to Galileo Electro-Optics Corp., Sturbridge, Mass.

Filed Jan. 6, 1976, Ser. No. 646,917
Int. Cl.² G01T *1/20*
U.S. Cl. 250—366 **29 Claims**

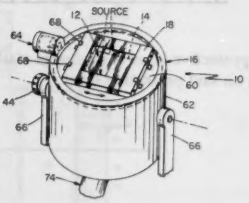
1. An instrument for obtainingg positional source information which comprises:

a slit collimator containing a multiplicity of slits for reception therein of beam components moving in a straight line from a source.

each slit of said slits including an open end for orientation toward said source and slit-defining walls extending inwardly from said open end,

said walls extending in the same longitudinal direction,

said walls including material of character and thickness to absorb those of said beam components impinging thereon, and



said slits extending further in one transverse direction than in the other transverse direction; and

a detector for separately detecting beam components passing through said slits,

said detector being fixedly mounted relative to said collimator.

4,090,081

SCINTILLATOR FOR GAMMA RAY CAMERA

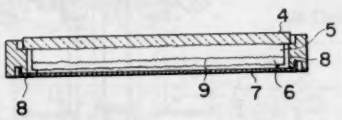
Katsumi Takami, Tokyo; Ken Ueda, Hachioji; Fumio Kawaguchi, Kokubunji; Teruichi Tomura, Kunitachi, and Kenji Ishimatsu, Abiko, all of Japan, assignors to Hitachi Medical Corporation, Japan

Filed Jul. 28, 1976, Ser. No. 709,384

Claims priority, application Japan, Jul. 28, 1975, 50-91112

Int. Cl.[2] G01T *1/20*

U.S. Cl. 250—368 **20 Claims**



1. In a scintillator for an Anger type camera apparatus having

a scintillating crystal structure for producing light rays; and means for coupling said light rays toward a photomultiplier; the improvement wherein

said scintillating crystal structure includes a photodiffuser for forming a substantially trapezoidal light distribution characteristic.

4,090,082

CIRCUITRY FOR IMPROVING LINEARITY OF A COUNTING SYSTEM

J. Howard Marshall, III, Pasadena, and Timothy M. Harrington, Sierra Madre, both of Calif., assignors to MDH Industries Inc., Monrovia, Calif.

Filed May 26, 1977, Ser. No. 800,801

Int. Cl.[2] G01T *1/18;* **G01R** *29/02*

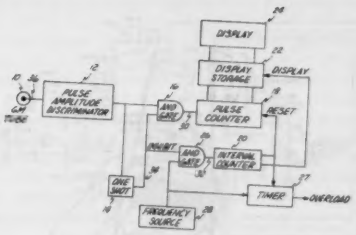
U.S. Cl. 250—375 **10 Claims**

1. For use in an electrical circuit, a method for operating a first pulse counter measuring the average pulse-repetition rate from that type of detector that exhibits a dead time associated with each detected event to make the response of said detector-counter system linear at increased rates of event detection, the method comprising the steps of:

(a) generating an inhibit signal following the occurrence of an output signal from the detector, the duration of the inhibit signal being chosen to exceed the maximum dead time of the detector;

(b) suspending operating of a time-measuring circuit for the duration of the inhibit signal;

(c) simultaneously preventing the first pulse counter from registering the arrival of additional detector pulses for the duration of the inhibit signal; and



(d) allowing the time-measuring circuit to control the counting interval for the first pulse counter in such a way that the number of detector pulses counted by the first pulse counter is equal to that which would occur if there were no detector dead time;

whereby the measurement of the average pulse-repetition rate is effected automatically and accurately even if the dead time of the detector changes.

4,090,083

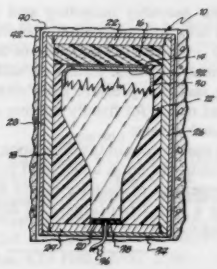
NUCLEAR REACTOR EX-CORE STARTUP NEUTRON DETECTOR

Jeffrey Roland Wyvill, South Windsor, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Oct. 14, 1976, Ser. No. 732,518

Int. Cl.[2] G01T *3/06*

U.S. Cl. 250—390 **20 Claims**



1. An Ex-core Startup Neutron Detector for a nuclear reactor comprising:

a. a photomultiplier tube having a radiation darkening resistant end window at an input end and an electrical connector at an output end;

b. a thermal neutron responsive scintillator medium in optical communication with said photomultiplier tube at said input end;

c. a neutron thermalizer adjacent to said scintillator medium whereby neutrons incident upon said neutron thermalizer are thermalized prior to passing into said scintillator medium; and

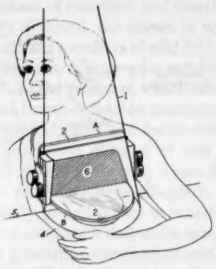
d. radiation shielding at least partially surrounding said photomultiplier tube.

4,090,084

MAMMOGRAPHY COMPRESSION APPARATUS

Heywood Y. Epstein, 250 E. 65th St., New York, N.Y. 10021, and Carmine Famiglietti, 37 Lynton Rd., Albertson, N.Y. 11507

Filed Feb. 24, 1977, Ser. No. 771,435
Int. Cl.[2] G03B *41/16*
U.S. Cl. 250—439 R 5 Claims



1. Mammography apparatus comprising:

A. a hollow metallic member for passage therethrough of X-rays from an X-ray source, said hollow member having a generally conical shape and a substantially flat side, said flat side containing an aperture in the lower part thereof to permit positioning of a woman's breast within said hollow member;

B. first selectable pressure plate means comprising a vertical portion shielded against X-rays and a horizontal portion transparent to X-rays, said first pressure plate means being movably mounted on said hollow member with said vertical portion being movable vertically externally of said hollow member along said flat wall of said hollow member, said horizontal portion being movable vertically within the confines of said hollow member for application of pressure to said breast positioned within said hollow member, the chest of the woman facing the vertical portion of said first pressure plate while the mammogram is being taken and pressure is being applied against the breast;

C. means for movably mounting said first pressure plate means on said hollow member comprising:

track means on the external surface of the sides of said hollow member, movable means on said tracks, means for attaching said first pressure plate means to said movable means, and means for fixedly holding said movable means on said track means;

D. cassette means containing film upon which said hollow member rests and upon which said breast is to be placed; said arrangement of cassette means and hollow member providing a long fixed target-film distance between said X-ray source and said film.

4,090,085

INTENSIFYING SCREEN FOR RADIOGRAPHS

Keiji Shimiya, Hiratsuka; Norio Miura, Isehara; Masao Takano, and Kunio Ishigaki, both of Minami-ashigara, all of Japan, assignors to Dai Nippon Toryo Co., Ltd., Osaka and Fuji Photo Film Co., Ltd., Minami-ashigara, both of, Japan

Filed Aug. 23, 1976, Ser. No. 716,369
Claims priority, application Japan, Aug. 28, 1975, 50-104258
Int. Cl.[2] H01J *1/62*
U.S. Cl. 250—483 10 Claims

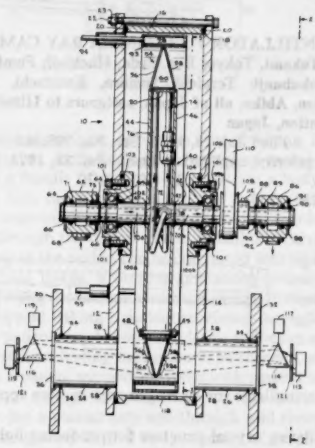
1. An intensifying screen for radiographs comprising a support layer, a phosphor layer carried on said support layer and a protective layer applied on said phosphor layer, wherein the improvement comprising a carbon black layer interposed between said support layer and said phosphor layer, and antistatic agents mingled in said protective layer, said carbon black layer absorbing light generated in said phosphor layer to enhance image definition and assisting the antistatic agent containing protective layer to discharge static charge which tends to form on said protective layer.

4,090,086

METHOD AND APPARATUS FOR GENERATING NEUTRONS

Lawrence Cranberg, Travis County, Tex., assignor to TDN, Inc., Austin, Tex.

Filed Mar. 18, 1974, Ser. No. 452,080
Int. Cl.[2] G21G *3/04*
U.S. Cl. 250—499 29 Claims



1. An apparatus for generating neutrons comprising:

a. a toroidal target support, said support mounted for rotational movement about the axis of the toroid, said support having a first external surface thereon extending generally around the perimeter of said support, said first surface having deposited thereon a first neutron emissive target;

b. a first source of ions, said first source directing ions to said first surface as the toroidal support rotates such that ions are spread over and impinge on said first target;

c. a second external surface on said support extending generally around the perimeter of said support, said second surface having deposited thereon a second neutron emissive target, including:

a second source of ions, said second source directing ions to said second surface as the toroidal support rotates such that ions from said first and second sources are spread over and impinge on said first and second surfaces, respectively;

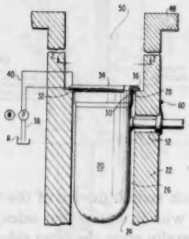
whereby the ions impinge on the targets on said first and second surfaces causing high energy neutrons to be emitted.

4,090,087

RADIATION SHIELD FOR NUCLEAR REACTORS

John Andrew Weissenfluh, 13212 Ridge Dr., Rockville, Md. 20850

Filed Sep. 8, 1976, Ser. No. 721,624
Int. Cl.[2] G21F 3/02
U.S. Cl. 250—519 14 Claims



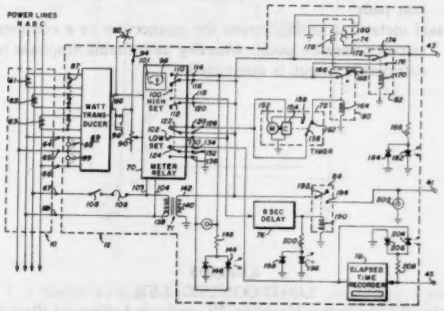
1. In a nuclear reactor system comprising a reactor vessel, a biological shield surrounding said vessel and spaced therefrom, said vessel and said shield having adjacent upper surfaces defining an upper opening for the space between said vessel and said biological shield, the improvement comprising a radiation shield covering said upper opening, said radiation shield comprising a reusuable flexible container, and a liquid radiation attenuating material in said container.

4,090,088

POWER MANAGEMENT SYSTEM

Melvin B. McMahon, San Jose, Calif.; Lloyd A. Guth, Palatine, and Larry A. Thomas, Elmhurst, both of Ill., assignors to Encon Systems, Inc., Santa Clara, Calif.

Filed Feb. 17, 1977, Ser. No. 769,584
Int. Cl.[2] H02J 13/00
U.S. Cl. 307—38 20 Claims



1. A power management system for improving the power utilization of a facility having a plurality of electric power consuming loads, comprising:

system control means for monitoring the power input to the facility and for developing a first control signal when the input power exceeds a predetermined peak level; and

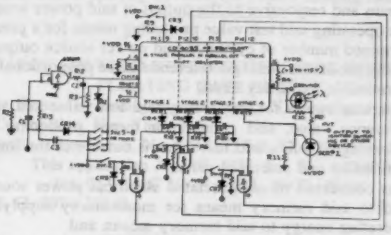
load control means for monitoring each load of the facility to determine which loads are running and therefore are eligible for shutdown on a prioritized basis, said load control means being responsive to said first control signal and operative to shutdown for predetermined periods of time one or more of the lowest priority eligible loads in the facility as required to prevent the peak power consumption of the facility from exceeding said predetermined peak level.

4,090,089

SEQUENTIAL CODED COMPUTERIZED ANTI-THEFT LOCK

Philip P. Morello, P.O. Box 261, Collegeville, and David M. Seroski, 02 Wartman Rd., Graterford, both of Pa. 19426

Filed Apr. 14, 1976, Ser. No. 671,731
Int. Cl.[2] H02J 3/14
U.S. Cl. 307—40 10 Claims



1. A security device for enabling apparatus which is being secured, said security device being operable by inputting to it a predetermined sequence plural digit signal, comprising:

a. a switch plate containing a first plurality of manually depressable switch buttons;

b. circuit means comprising a second plurality of switch elements for producing an output signal when said switch elements are switched in a predetermined sequence;

c. connecting means for connecting respective ones of said switch buttons to respective ones of said switch elements;

d. said circuit means further comprising a plural stage parallel in parallel out static shift register and shift circuit means for shifting signals successively from the output of one of the stages to the input of the next one of said stages only when said switch elements have been switched in said predetermined sequence;

e. output circuit means connected to an output terminal of the last stage of said register, for generating an output signal when said switch elements have been switched in said predetermined sequence;

f. reset means for resetting said register whenever one of said switch elements is switched out of said predetermined sequence; and

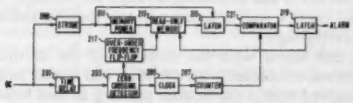
g. enabling circuit means adapted to be connected to said secured apparatus, having an input connected to said output circuit means, for enabling said secured apparatus when said output signal is generated.

4,090,090

AUTOMATIC TRANSFER CONTROL DEVICE AND FREQUENCY MONITOR

Paul M. Johnston, Hempfield Township, Westmoreland County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 19, 1976, Ser. No. 706,975
Int. Cl.[2] H02J 1/00, 3/00
U.S. Cl. 307—87 5 Claims



1. Apparatus for generating signals to cause associated circuit interrupters to selectively energize an electrical distribution system from a plurality of electrical power sources, comprising:

means adapted for connection to associated circuit interrupters for generating CLOSE and TRIP signals for associ-

ated circuit interrupters in response to activating signals; and

frequency monitoring means connected to said electrical power sources and to said CLOSE and TRIP signal generating means for generating activating signals in response to the frequency of said sources, said frequency monitoring means comprising:

means for producing a test value proportional to time;

synchronizing means connected to said test value producing means and responsive to the output of said power source for operating said test value producing means for a predetermined number of cycles of said power source output;

memory means for storing a reference value proportional to permissible frequency limits;

comparator means for comparing said test value and said reference value, said comparator means producing an alarm signal when said test value is outside of the limits defined by said reference value;

means connected to an associated electrical power source and to said memory means for momentarily supplying operating energy to said memory means; and

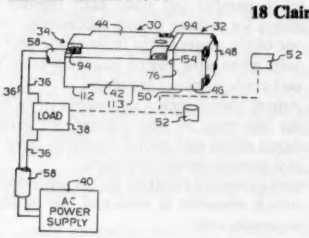
means for latching the output of said memory means and for supplying said memory means output to said comparator means.

4,090,091

HOUSING AND CONTROL CIRCUIT ASSEMBLY WITH SENSING ELEMENT

Dennis L. Brown, Bradenton; Gordon E. Gee, and Michael A. Wilson, both of Sarasota, all of Fla., assignors to Electro Corporation, Sarasota, Fla.

Filed Mar. 17, 1976, Ser. No. 660,255
Int. Cl.[2] H01H *36/00*
U.S. Cl. 307—116 **18 Claims**



1. A housing and a circuit assembly for controlling a load connected through a lead therewith, comprising:

a housing body defined by a top, bottom and a plurality of interconnected side walls, with a lead passage through one of said side walls, said top and bottom walls each having an opening, and an interior wall between the top and bottom wall openings having an inclined portion facing said lead passage and extending upwardly toward said top opening and having a terminal surface portion facing the opening in the top wall;

an elongated conductive terminal member having one end received in and extending through the terminal surface of said interior wall adjacent said top opening and accessible therethrough;

a circuit board with the elements of the control circuit thereon connected with the other end of said terminal and received within the bottom opening of said housing, said control circuit including a conductor on said circuit board contacting the other end of the terminal and electrically connecting a circuit element with the terminal; and

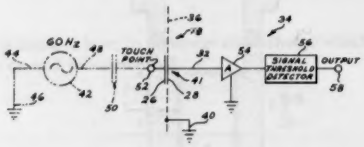
means for electrically connecting an external lead with one of the circuit elements mounted on said circuit board, including means for connecting the lead to the accessible part of the conductive terminal member adjacent said top opening.

4,090,092

SHIELDING ARRANGEMENT FOR A CAPACITIVE TOUCH SWITCH DEVICE

Juan de. J. Serrano, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Jul. 16, 1976, Ser. No. 705,830
Int. Cl.[2] H01H *35/00*
U.S. Cl. 307—116 **8 Claims**



8. In a capacitive touch switch device of the type having a dielectric sheet element with front and rear sides; a conductive touch pad disposed generally upon the front side of the dielectric sheet element; a pair of conductive pads disposed generally upon the rear side of the dielectric sheet element with at least a portion of each rear pad in overlapping relationship with the touch pad, each of the rear pads thereby forming, with the touch pad, the two plates of a capacitor, the touch pad being common to the two capacitors thereby formed, one of the rear pads adapted for connection to an alternating current signal source and the other of the rear pads adapted for connection to a signal loss detector, whereby in use the capacitive shunting effect to ground of a person touching the touch pad causes a decrease in signal supplied to the signal loss detector, the improvement comprising:

a conductive shield plate in the form of a metallized adhesive film of sandwich construction having a flexible sheet base with adhesive on one side of said flexible sheet base and metal foil on the other side of said flexible sheet base;

said metallized adhesive film adhered by means of said adhesive to the rear side of the dielectric sheet element and substantially surrounding, but not touching, the pair of rear pads;

said metal foil having means for connection to a common circuit reference point, whereby undesirable response to extraneous stimuli is minimized.

4,090,093

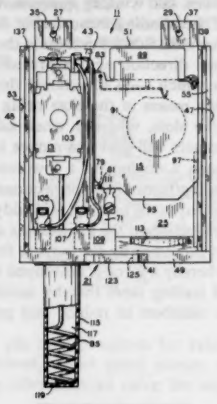
LOAD CONTROLLER

Paige W. Thompson, Morrison, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Filed Feb. 9, 1977, Ser. No. 767,230
Int. Cl.[2] H01H *37/00*
U.S. Cl. 307—117 **44 Claims**

4. In a load controller having a plurality of operating component units adapted for controlling the supply of power from a source thereof to a load and including a condition responsive device having associated therewith means for sensing a preselected condition, a pair of separable housing members releasably engaged with each other and including a plurality of wall means defining a chamber in which the unit plurality is mounted; the improvement comprising means associated with one of the housing members for receiving at least a part of the sensing means so that it is predeterminately spaced from the immediate environment of the unit plurality in the chamber, said receiving means extending beyond one of the wall means

of the wall means plurality and including another chamber enclosed within said receiving means and communicating with



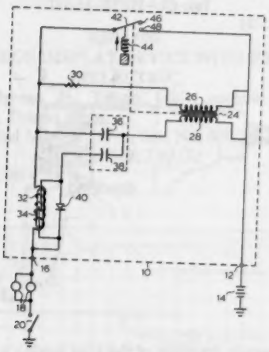
the first named chamber and into which the at least part of the sensing means extends.

4,090,094

FLASHER SWITCH WITH OUTAGE INDICATION

William Musgrave Blaiklock, Dundas, and Ronald Sherwin John Korody, Burlington, both of Canada, assignors to Tridon Limited, Burlington, Canada

Filed Jan. 24, 1977, Ser. No. 761,775
Int. Cl.[2] H01H *47/14, 51/34*
U.S. Cl. 307—132 M **3 Claims**



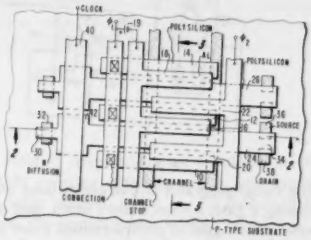
1. A flasher switch with outage indication comprising, a pair of switch terminals, a magnetisable core, first and second operating coils on the core and connected in parallel between said switch terminals to be supplied in parallel with current from a D.C. power source connected between said switch terminals and to produce in the core upon such supply of current substantially equal opposed magnetic forces, a contactor, biasing means for the contactor, the contactor being movable in one direction from a first to a second position in response to energization of the core by a magnetic force of one of the operating coils and movable in the opposite direction from the second to the first position under the action of the said biasing means, first and second capacitors connected in series with the second coil to be charged by current passing through the second coil whereby upon discharge of at least the first capacitor through the second coil it causes energization of the core sufficient for maintenance of the contactor in the said second position, a movable contact moved by the said contactor, another contact engaged by the said movable contact when the contactor is in the said second position, shortcircuit means comprising the contactor establishing a shortcircuit across the capacitors and the second coil when the movable and another contacts are engaged, and a current detector connected to detect the magnitude of the current flowing between said movable and another contacts when engaged and responsive to a decrease of said current below a predetermined level to prevent discharge of the second capacitor through the second coil to thereby increase the switch flashing rate.

4,090,095

CHARGE COUPLED DEVICE WITH DIODE RESET FOR FLOATING GATE OUTPUT

Eric Peter Herrmann, Bound Brook, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 658,677, Feb. 17, 1976, abandoned.
This application Jun. 27, 1977, Ser. No. 810,392
Int. Cl.[2] G11C *19/28;* H01L *29/78, 29/04*
U.S. Cl. 307—221 D **8 Claims**



1. A charge-coupled device (CCD) register output stage comprising, in combination:

a semiconductor substrate of given conductivity type and at a given potential, said substrate formed with a CCD channel along which charge can propagate;

a group of *n* adjacent electrode means, each such electrode means capacitively coupled to said CCD channel for the storage and propagation of charge, where *n* is an integer greater than 2;

n-1 connections for a *n*-1 phase voltage source connected to *n*-1 of the electrode means, respectively, of said group of *n* electrode means, the remaining electrode means of said group comprising an output electrode;

output means coupled to said output electrode for producing an output signal of a value dependent upon the amount of charge propagated to the region of said channel adjacent to said output electrode;

a region in the substrate outside of said CCD channel, said region being of opposite conductivity type than the substrate and forming a semiconductor junction with said substrate, said region operating as one electrode of a simple semiconductor diode, the substrate operating as the other electrode of this simple diode;

said output electrode being insulated from the substrate over the major portion of its length and being in ohmic contact with said region of opposite conductivity type at one portion thereof; and

means capacitively coupled to said output electrode at a portion thereof outside of said channel for applying to said output electrode first and second voltage levels, said first level being such as to produce on said output electrode a given voltage level at which a depletion region for the storage of charge forms in the substrate to thereby permit the transfer of charge to said depletion region and at which said semiconductor junction is reverse biased, whereby there is a high impedance between said output electrode and said substrate and said output electrode remains at substantially said given voltage level for the duration of said first level, and the change in said applied

voltage from said first to said second level being in a sense and amount to reduce the depth of said depletion region to thereby facilitate the transfer of charge away from said depletion region and to concurrently forward bias said semiconductor junction for clamping said ouput electrode to said given potential of said substrate of said given conductivity type during the period said second voltage level is present.

4,090,096

TIMING SIGNAL GENERATOR CIRCUIT

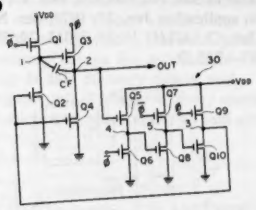
Akira Nagami, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Mar. 29, 1977, Ser. No. 782,419

Claims priority, application Japan, Mar. 31, 1976, 51-35825

Int. Cl.[2] H03K *1/18, 5/01, 17/28;* **G11C** *8/00*

U.S. Cl. 307—269 **10 Claims**



1. A timing signal generator circuit comprising a field-effect transistor having a gate, a source and a drain, said drain being supplied with a first signal of predetermined pulse width, said source being connected to a capacitive output node, and said gate being connected to a capacitive circuit node; means for precharging said circuit node to a voltage sufficient to cause said transistor to be in a conductive state before said first signal is applied to said drain of said transistor; a delay circuit having a predetermined delay time and having an input connected to said output node; and means connected to the output of said delay circuit for discharging said output node and said circuit node following the charging of said capacitive output node to a level indicative of said first signal, when applied in response to the output of said delay circuit.

4,090,097

ELECTROMAGNETIC DEVICES

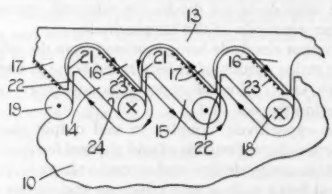
Alec Harry Seilly, North Wembley, England, assignor to Simms Group Research & Development Limited, Birmingham, England

Filed Dec. 17, 1976, Ser. No. 751,722

Claims priority, application United Kingdom, Jan. 22, 1976, 2518/76

Int. Cl.[2] H02K *33/00*

U.S. Cl. 310—27 **6 Claims**



1. An electromagnetic device of the kind comprising first and second relatively movable magnetizable members, an electrical winding means, the first of said members including a plurality of slots disposed in side by side relationship, the second of said members including a plurality of projections entering into said slots respectively and of a smaller width than said slots, one opposed side face of each slot and each projection defining attraction faces and the other two opposed faces defining trailing faces, said winding means wound in said slots, the connection of the winding means being such that at least two spaced slots have the flow of current in the winding means therein in the same direction and separated by at least one interposed slot in which such directional flow of current is absent, the winding means in the slots being secured on the trailing faces of the slots, whereby when said windings are energized the members will move to reduce the gap between said attraction faces, a coating of a low resistance material secured to the trailing faces of the projections such that eddy currents are generated in the coating, said eddy currents creating a magnetic field adjacent the projections acting to oppose the magnetic field produced by the current flow through said winding means whereby a force is developed tending to cause separation of said trailing faces thereby assisting the relative movement of the members to reduce said gap between said attraction faces.

4,090,098

ARRANGEMENT FOR ELECTRICALLY CONNECTING WIRE COILS OF AN ELECTRIC MACHINE TO AN ELECTRIC CIRCUIT

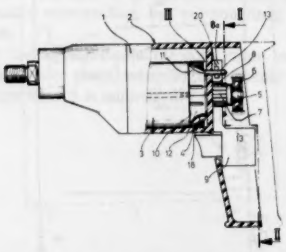
Ernst Kränzler, Stetten, and Gerhard Kuhlmann, Stuttgart, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Oct. 12, 1976, Ser. No. 731,501

Claims priority, application Germany, Oct. 17, 1975, 2624522; Jun. 1, 1976, 2546528

Int. Cl.[2] H02K *11/00*

U.S. Cl. 310—71 **33 Claims**



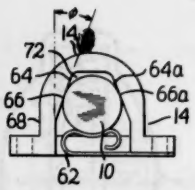
1. In an electric machine of the type having a stator including an armature and wire coils mounted thereon, and an electric circuit for supplying electric current to the wire coils, an arrangement for establishing electric contact between the circuit and the wires of the wire coil, comprising support means stationarily mounted at one axial end of the stator and being at least partly of an electrically insulating material; and at least partly electrically conductive contact elements rigid with said support means and extending therefrom away from said one end of the stator into contact with the circuit, each of said contact elements including a pin-shaped projection on said support means having an elongated slot for receiving a portion of a respective wire of a respective wire coil, and an electrically conductive contact cap adapted to be pressed onto said pin-shaped projection to thereby clamp said portion of the respective wire which is located intermediate said pin-shaped projection and said contact cap, and received in said slot and electrically connect the respective contact element to the respective wire.

4,090,099

POINT SENSOR MOUNTING APPARATUS

Vernon M. Daffron, Ellisville, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.

Filed Mar. 31, 1976, Ser. No. 672,487
Int. Cl.[2] H02K 21/26
U.S. Cl. 310—168 10 Claims



1. In a wheel slip control system for automotive vehicles having a tone wheel, wheel speed sensor, wheel slip logic circuit and brake-relief solenoid valve, the improvement comprising:

a holding fixture body containing a cavity therethrough;

support means for retaining said holding fixture body in a fixed position adjacent to a rotatable tone wheel within the hub of an automotive wheel;

a wheel speed sensor within the cavity in said holding fixture body;

a resilient metallic pressure means attached to said holding fixture body for applying force on the surface of and substantially normal to the axis of said generally cylindrical wheel speed sensor; and

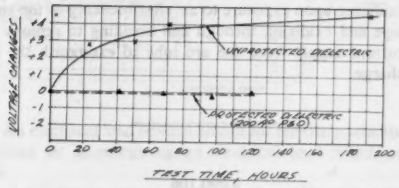
wherein the cavity in said holding fixture body is generally an inverted U-shape with the legs of the U tapering inward from the vertical by a predetermined angle.

4,090,100

GAS DISCHARGE DISPLAY DEVICE WITH PROTECTED DIELECTRIC

Bernard W. Byrum, Jr., Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 21, 1975, Ser. No. 560,348
Int. Cl.[2] H01J 61/30
U.S. Cl. 313—220 20 Claims



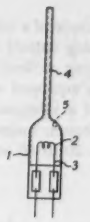
1. As an article of manufacture, a gaseous discharge device comprising an ionizable gaseous medium, opposing arrays of conductors spaced from each other on opposite sides of said gaseous medium and which define a plurality of gaseous discharge sites within the ionizable gaseous medium, one at each cross-point between pairs of conductors, one from each array, at least one dielectric body between at least one array of conductors and the gaseous medium to insulate the array of conductors from the gaseous medium, and a protective film on only portions of the surface of said dielectric body facing said gaseous medium between said gaseous discharge sites to isolate said portions of the dielectric body from the gaseous medium, said protective film being excluded from said surface of said dielectric body at said discharge sites, whereby a valley of the active surface of the dielectric body is in contact with the gaseous medium at each discharge site and said valley is surrounded by a ridge of said protective film.

4,090,101

MANUFACTURE OF ELECTRIC LAMPS

John Michael Rees; Christopher Arthur Horler, both of London, and Anthony Peter Downing, Runcorn, all of England, assignors to Thorn Electrical Industries Limited and Imperial Chemical Industries Limited, both of London, England

Filed Jan. 17, 1977, Ser. No. 759,705
Int. Cl.[2] H01S 61/12
U.S. Cl. 313—223 3 Claims



1. In an electric lamp having an envelope, an electrically activated light emitting structure within said envelope with conductive leads thereto, and a gas fill including fluorine in said envelope, the improvement which comprises:

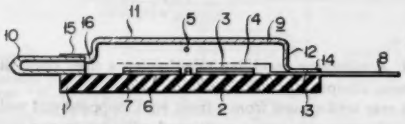
a fluorocarbon polymer included within said envelope as a source of said fluorine.

4,090,102

COVER GLASS STRUCTURE OF FLAT TYPE INDICATOR TUBE

Osamu Yasutome, Taishi; Mitsuo Takeda, Tokyo; Yasumasa Mori, Hyogo, and Tagayasu Sawamura, Himeji, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Feb. 3, 1977, Ser. No. 765,424
Int. Cl.[2] H01J 5/24, 7/22, 19/58, 19/72
U.S. Cl. 313—317 2 Claims



1. A flat type indicator tube comprising:

a substrate;

a display section including a plurality of anode segments disposed on said substrate;

a cathode stretched above and across said display section;

a box-like cover glass disposed on said substrate to form a hermetically sealed space for accommodating said display section and said cathode therein;

a coupling portion integral with said cover glass which extends outwardly from the side wall of said cover glass;

a projection formed by inwardly recessing the base portion of the coupling portion; and

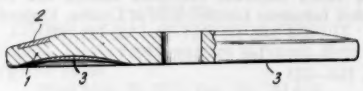
an exhaust tube which is received in said coupling portion and is hermetically fixed between said coupling portion and said substrate, with one end thereof contacting said projection and the other end thereof being sealed.

4,090,103

X-RAY TARGET

Rudolf Machenschalk, and Hubert Bildstein, both of Reutte, Austria, assignors to Schwarzkopf Development Corporation, New York, N.Y.

Filed Mar. 16, 1976, Ser. No. 667,466
Claims priority, application Austria, Mar. 19, 1975, 2120/75
Int. Cl.[2] H01J *35/08*
U.S. Cl. 313—330 13 Claims



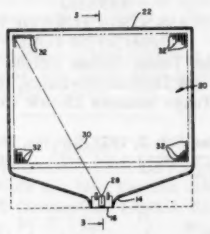
1. An X-ray target made of a refractory metal having a high thermal emission coating outside the focal area, the improvement comprising having at least part of the target surface outside the focal area equipped with a coating of a mixture material consisting of a substance selected from the group consisting of molybdenum, tungsten, niobium, tantalum and mixtures thereof; and 20 to 60 volume percent of a ceramic oxide.

4,090,104

OPTICAL FIBER TELEVISION SCREEN

Clyde R. Vann, and Roy R. Vann, both of Box 38, Artesia, N. Mex. 88210

Filed Mar. 7, 1977, Ser. No. 774,876
Int. Cl.[2] H01J *29/56*
U.S. Cl. 313—422 11 Claims



1. A television receiving tube having a fiber optic display screen, comprising:

a rear wall spaced from a front wall, opposed end walls, an electron gun means positioned adjacent to one said end wall and located in such a manner to direct an electron beam towards the opposed end wall and onto the interior surface of said front wall;

said front wall includes a plurality of optical fibers having a light receiving end and a light emitting end, said fibers being arranged in side-by-side relationship with said light receiving ends forming said interior surface; each said fiber having said light emitting end arranged along a common plane for providing a screen upon which an image can be viewed; said fibers being arranged normally respective to the front wall and laterally respective to the scanning electron beam from said electron gun;

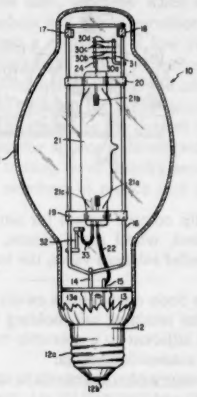
each light receiving ends of said fibers being formed into an inclined plane and orientated respective to the gun to receive an electron beam therefrom so that light is propagated along the interior of the fiber and is effected to illuminate said screen.

4,090,105

HIGH INTENSITY DISCHARGE LAMP WITH MULTIPLE FILAMENT TO EXTINGUISH LAMP WHEN OUTER ENVELOPE BREAKS

Ronald C. Koo, Upper Montclair, N.J., assignor to Duro-Test Corporation, North Bergen, N.J.

Filed Apr. 15, 1976, Ser. No. 677,267
Int. Cl.[2] H01J *7/44*; H05B *41/231*
U.S. Cl. 315—74 11 Claims



1. An arc discharge type electric lamp comprising:

an envelope,

arc tube means within said envelope including electrodes and an ionizable medium for producing a discharge including radiation in the visible and invisible range upon the application of current thereto,

means for supplying current to said arc tube means to produce said discharge

and current interrupting means within said envelope in series with the current supply means and said arc tube means, said current interrupting means comprising a plurality of resistively heated, oxidizable, incandescible filaments electrically connected in parallel and capable of carrying the lamp current under normal starting and operating conditions having substantially no ballast current control function with respect to the current supplied to the arc tube means, said filaments when carrying the lamp current oxidizing upon exposure to air after breaking of the envelope and oxidizing through and breaking to remove the current supply from the arc tube to extinguish the discharge.

4,090,106

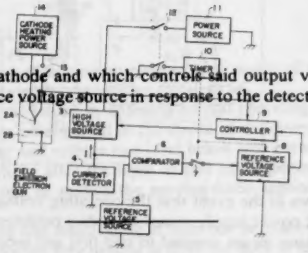
FIELD EMISION ELECTRON GUN WITH CONTROLLED POWER SUPPLY

Masahide Okumura, Hachioji; Yoshio Sakitani, Iruma, and Yukichi Ueno, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 20, 1976, Ser. No. 751,987
Claims priority, application Japan, Dec. 26, 1975, 50-155067
Int. Cl.[2] G05F *1/00*; H05B *37/02*
U.S. Cl. 315—107 7 Claims

1. A field emission electron gun comprising a cathode for emitting electrons, an anode, a high voltage source which applies a high voltage between said cathode and said anode in order to emit the electrons from said cathode, a reference voltage source, a high voltage control circuit which controls the output voltage of said high voltage source in response to an

output voltage of said reference voltage source, and a reference voltage control circuit which detects the emission current from said cathode and which controls said output voltage of said reference voltage source in response to the detected value.



4,090,107

ELECTRIC CIRCUIT CONTROL SYSTEM USING LOGIC DEVICE

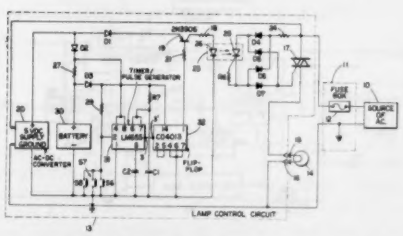
James N. Seib, R.R. 1, Williams, Ind. 47470

Filed Dec. 8, 1976, Ser. No. 748,533

The portion of the term of this patent subsequent to Mar. 8, 1994, has been disclaimed.

Int. Cl.[2] H05B *37/02, 39/04*

U.S. Cl. 315—156 **18 Claims**



13. An electrical load control circuit for remotely selectively energizing or de-energizing an electrical load which comprises:

(a) an AC supply source of at least about 120 volts at about 60 Hertz;

(b) an electrical load;

(c) a DC operated AC control means for controlling the power applied to said electrical load from said AC supply source, said AC control means being capable of controlling at least 25 watts of power;

(d) said AC control means including an optical coupling means for providing electrical isolation between the input and the output of said AC control means;

(e) a DC power supply for converting the AC from the AC supply source to DC, said DC power supply providing power to DC operated AC control means; and

(f) a first manually operable switch electrically connected to control the optical coupler.

4,090,108

INTERFACE SYSTEM TO CONTROL FLASH LAMP

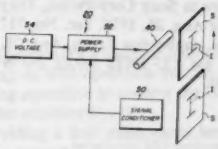
Richard Calvin Johnson, Pasadena, Calif., and Ihor Kulbida, Fairport, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 585,946, Jun. 11, 1975, Pat. No. 4,039,770.

This application Jul. 26, 1976, Ser. No. 708,788

Int. Cl.[2] H05B *41/34, 37/02;* **G03B** *27/76*

U.S. Cl. 315—158 **2 Claims**



1. A method of controlling the energy to a flash lamp in response to toner image density on copy sheets comprising the steps of optically sensing the density of toner images on copy sheets advanced along a path, converting the optically sensed information into electrical signals proportional thereto, and transmitting the signals to uni-directional switching means coupled to a variable energy storage device to control the input to said energy storage device for driving the flash lamp in response to the density of toner images on said copy sheets.

4,090,109

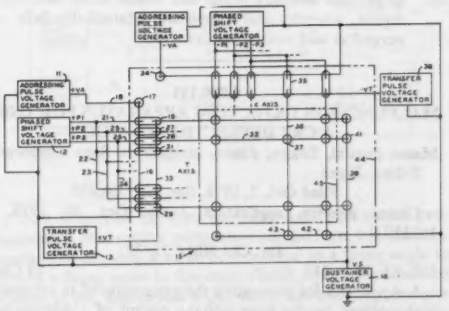
GAS DISCHARGE COUPLING OF DRIVING CIRCUITRY TO A GAS DISCHARGE DISPLAY/MEMORY PANEL

William H. Ryan, Toledo, Ohio, and William E. Johnson, Temperance, Mich., assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Oct. 6, 1976, Ser. No. 730,037

Int. Cl.[2] H05B *37/00*

U.S. Cl. 315—169 TV **16 Claims**



1. In a gas discharge display device including an envelope containing an ionizable gaseous medium and having a pair of opposing electrode arrays transversely oriented so as to define a matrix of gas discharge panel cells within the gaseous medium in the vicinity of the crosspoints of the opposed panel electrodes, the panel electrodes of at least one of the arrays being insulated from the gaseous medium by at least one dielectric member, and means for coupling driving circuitry to the electrode arrays, the driving circuitry including means for

generating an addressing pulse voltage and shifting the voltage to a selected panel cell to initiate a discharge therein and means for generating a sustainer voltage to maintain a sequence of discharges in the selected cell, the improvement in the panel comprising: a plurality of gas discharge coupling cells each defined by at least one crosspoint of one of the electrodes of the electrode arrays and an electrode connected to the driving circuitry, at least two of said coupling cells being shift cells each connected between the addressing pulse voltage generating means and a respective one of said panel electrodes.

4,090,110

CONVERGENCE MEANS FOR COLOR CATHODE RAY TUBE

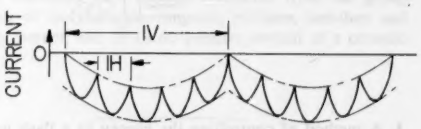
Seiichi Ogawa, Tokyo, and Hiroyuki Sumiya, Fussa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 25, 1976, Ser. No. 717,476

Claims priority, application Japan, Aug. 25, 1975, 50-102810

Int. Cl.[2] H01J *29/70, 29/76*

U.S. Cl. 315—368 **10 Claims**



1. A convergence correction system for a color cathode ray tube comprising a fluorescent screen and means to produce three electron beams, said system comprising a deflection yoke to deflect said beams at line repetition rate in a raster pattern repeated at field repetition rate on said screen, and system further comprising:

static convergence correction means to cause said beams to be substantially fully converged to common points at certain outer regions of said screen and to be only partially converged at the central region of said screen; and

magnetic, dynamic, convergence correction means comprising a coil and current-generating means connected thereto to supply to said coil a magnetic convergence correction current that has a repetitive waveform with a maximum magnitude when said beams strike the central region of said screen and a lesser magnitude when said beams are deflected to strike said certain outer regions of said screen to cause said coil to produce a magnetic convergence field of greatest intensity when said beams strike said central region, whereby said beams are substantially fully converged at said central region.

4,090,111

MALFUNCTION DETECTING APPARATUS FOR USE IN A CRT DEFLECTION CIRCUIT

Masao Suzuki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Oct. 7, 1976, Ser. No. 730,476

Claims priority, application Japan, Oct. 20, 1975, 50-14222[U]

Int. Cl.[2] H01J *29/70*

U.S. Cl. 315—411 **10 Claims**

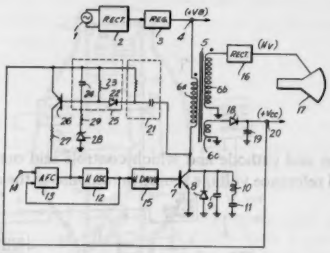
1. Apparatus for preventing the generation of an excessively high voltage by the high voltage circuit of a television receiver, comprising:

a horizontal output circuit responsive to horizontal scanning pulses and including a switching device, resonant capacitor and flyback transformer connected for producing periodic flyback pulses having a normal frequency component;

power supply means coupled to said switching device for applying an operating voltage thereto;

first detecting means comprising high pass filter means coupled to said flyback transformer to allow only high frequency components above said normal frequency to pass through, and rectifying means for detecting a high frequency component included in said flyback pulses in the event of a malfunction of said resonant capacitor, said high frequency component causing said high voltage circuit to generate an excessively high voltage;

second detecting means coupled to said flyback transformer for detecting an excessive voltage level of said flyback



pulses in the event that the operating voltage applied by said power supply means exceeds a predetermined level;

switching means coupled to said first and second detecting means and actuated in response to said detected high frequency component and to said detected voltage level, respectively; and

means for controlling said horizontal output circuit when said switching means is actuated thereby to reduce the level of said flyback pulses.

4,090,112

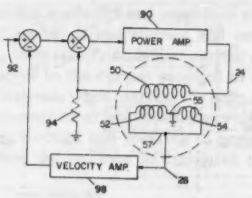
ELECTRICALLY DAMPED OSCILLATION MOTOR

Peter Selverstone, Cambridge, Mass., assignor to General Scanning, Inc., Watertown, Mass.

Filed Aug. 23, 1976, Ser. No. 716,534

Int. Cl.[2] H02K *33/00*

U.S. Cl. 318—128 **11 Claims**



1. An oscillation motor comprising a stator, a rotor supported within said stator with an annular gap therebetween, a permanent magnet providing a magnetic field across said annular gap transverse to the axis of rotation of said rotor, a drive winding on either said rotor or said stator for passing an electric current that interacts with said magnetic field to produce rotational deflection of said rotor,

a tachometer winding in fixed relation to said drive winding,

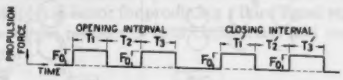
a compensation winding in fixed relation to said drive winding and at a greater radial distance from said annular gap than said tachometer winding,

and circuitry connecting said tachometer winding and said compensation winding together to produce a net velocity signal for electrically damping said rotor as a function of the angular velocity of said rotor while cancelling mutual inductance signals induced in said tachometer and compensation windings by flow of electric current in said drive winding.

4,090,113
METHOD OF DRIVING DOOR OF AUTOMATIC DOOR ASSEMBLY

Masaaki Ogishi, Kurobe, Japan, assignor to Yoshida Kogyo, K.K., Tokyo, Japan

Filed Jun. 10, 1976, Ser. No. 694,607
Claims priority, application Japan, Jun. 10, 1975, 50-69903
Int. Cl.[2] H02P 3/20
U.S. Cl. 318—282 1 Claim

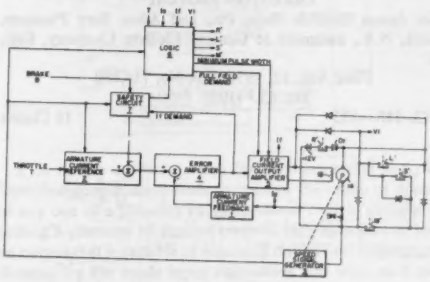


1. A method of driving an electric door motor of an automatic door assembly, comprising the steps of:
(a) driving the motor by at least a normal operating voltage during an initial period of the stroke of the door;
(b) reducing said voltage to a level below said normal operating voltage after the lapse of said initial period of the door stroke to reduce the moving-force applied to the door;
(c) restoring and maintaining at least the normal operating voltage for the time needed to drive the door to the end of its stroke; and
(d) thereafter, removing said voltage.

4,090,114
SAFETY FEATURES FOR ELECTRIC VEHICLE CONTROL

Francis T. Thompson, Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 7, 1974, Ser. No. 448,862
Int. Cl.[2] H02P 7/14
U.S. Cl. 318—139 18 Claims

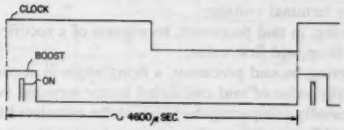


1. An electric vehicle comprising:
a direct current drive motor;
a separately excited field winding disposed within said direct current drive motor;
a direct current power supply;
connecting means for connecting said direct current power supply to the armature of said direct current drive motor switchable between an open position disconnecting said direct current power supply from said direct current drive motor and a closed position connecting said direct current power supply to said direct current drive motor;
field control means connected to said separately excited field winding for supplying field excitation in response to operator control and vehicle operating parameters;
motor overspeed control means connected to said field control means for limiting the maximum speed of said direct current drive motor by causing said field control means to supply at least full rated field current to said separately excited field winding when the speed of said direct current drive motor exceeds a predetermined value.

4,090,115
TRANSIT VEHICLE CHOPPER CONTROL APPARATUS AND METHOD

James H. Franz, Jr., Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 29, 1976, Ser. No. 709,687
Int. Cl.[2] H02P 5/06, 5/34, 7/06
U.S. Cl. 318—341 9 Claims

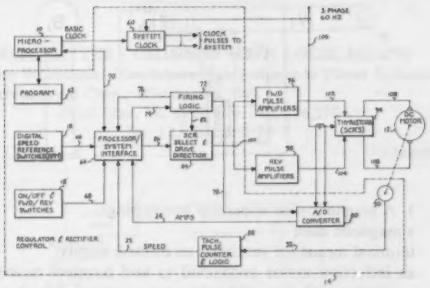


1. In control apparatus for a chopper operative with a power supply and having an ON operation and an OFF operation, said chopper being operative to control the energization of an electric motor, the combination of
means for providing a first pulse signal having a first time period and a second pulse signal having a second time period greater than said first time period and including said first time period within the second timer period of the second pulse signal,
means responsive to the provision of said first pulse signal for determining the ON operation of said chopper, and
means responsive to the provision of said second pulse signal for determining the continued operation of said chopper with said power supply.

4,090,116
CLOSED LOOP DIGITAL CONTROL SYSTEM AND METHOD FOR MOTOR CONTROL

David L. Lippitt, Scotia, N.Y., assignor to General Electric Company, Salem, Va.

Filed Dec. 10, 1976, Ser. No. 749,648
Int. Cl.[2] H02P 7/28
U.S. Cl. 318—345 E 17 Claims



1. In a system of the type including a data processor programmed to read system parameters and perform calculations, a method of deriving a value proportional to a firing angle to develop a firing pulse to fire controllable rectifiers connected between an AC source and a DC motor to control the transfer of power from the AC source to the DC motor comprising the steps of:
(a) generating indicia synchronized with the AC source specifying a first value proportional to a phase interval of the AC source derived from phase crossings of the AC source and a second value synchronized with the first value specifying an increment of time within that phase interval;
(b) directing the processor to selectively read system parameters proportional to desired motor speed, actual motor speed and motor current and said indicia;

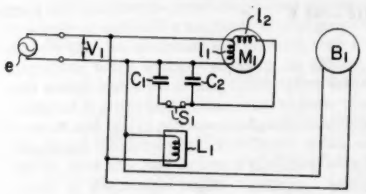
(c) calculating, in the processor, a value which specifies a time to use a calculated firing angle by comparing said second value with a predetermined constant proportional to system calculation time;
(d) calculating, in the processor, a value proportional to a required motor terminal voltage from the system parameters read thereby;
(e) selecting, in the processor, a value proportional to firing angle in accordance with the value of said calculated motor terminal voltage;
(f) deriving, in said processor, an address of a rectifier to be fired from said first value;
(g) selecting, in said processor, a firing angle in accordance with the value of said calculated motor terminal voltage;
(h) repeatedly comparing the value of the calculated time to use said firing angle with said second value to get a comparison;
(i) incrementally changing the magnitude of said firing angle starting at a time when said comparison is achieved; and
(j) generating a firing pulse to fire a rectifier specified by said derived address when the magnitude of said firing angle achieves a specified value.

4,090,117

MAGNETIC DISC APPARATUS

Asao Sasamoto, and Hideaki Amano, both of Odawara, Japan, assignors to Hitachi, Ltd., Japan

Filed Sep. 13, 1976, Ser. No. 722,577
Claims priority, application Japan, Sep. 25, 1975, 50-130216[U]
Int. Cl.[2] H02P *3/04*
U.S. Cl. 318—365 **1 Claim**



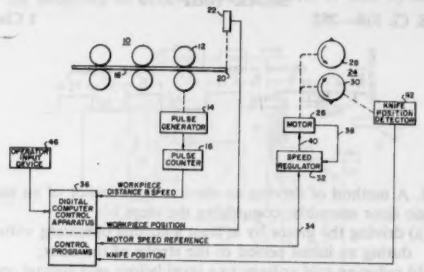
1. A magnetic disc apparatus comprising:
a magnetic disc;
terminal means for receiving an electric supply;
an induction motor connected to said terminal means for rotating said disc, said motor being provided with a first capacitor which is operative at the start of said motor and a second capacitor which is operative constantly;
an electromagnetic brake connected to said terminal means and adapted to be placed into operation for stopping rotation of said motor when deenergized; and
a delay relay connected in parallel with said electromagnetic brake and having a normally-closed contact, said first capacitor being connected in parallel with said second capacitor through said normally-closed contact, whereby when said electric supply is cut off from said terminal means said normally-closed contact is closed and the starting time for placing said electromagnetic brake into operation is delayed by supplying said electromagnetic brake with a current generated by said motor due to an inertia rotation thereof upon the cutting-off of said electric supply from said terminal means.

4,090,118

WORKPIECE SHEAR CONTROL

Andrew W. Smith, Jr., Mt. Lebanon, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 25, 1976, Ser. No. 670,584
Int. Cl.[2] H02P *1/04*
U.S. Cl. 318—392 **24 Claims**



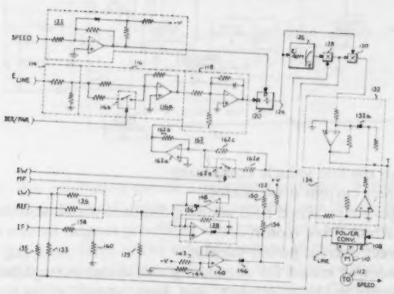
1. In apparatus for providing a desired cut of a moving workpiece by a shear device driven by a motor, the combination of:
means for determining the movement of speed of the workpiece;
means responsive to said speed for determining an operational parameter of the shear device at the time of the workpiece cut; and
means for controlling said shear device by one of first and second predetermined speed characteristics in accordance with said determined operational parameter.

4,090,119

TORQUE ANALOG OF A SERIES WOUND DC TRACTION MOTOR

Robert James Griffith, Erie, Pa., and Allan Barr Plunkett, Scotia, N.Y., assignors to General Electric Company, Erie, Pa.

Filed Aug. 12, 1976, Ser. No. 714,080
Int. Cl.[2] H02P *7/00*
U.S. Cl. 318—432 **18 Claims**



1. Apparatus for deriving a signal representative of the magnitude of armature current which would exist in a direct current(d-c), series-wound traction motor during selected operating states of the motor, said selected operating states being represented by a plurality of status signals, said apparatus comprising:
a. first means responsive to the status signals for providing a first signal indicative of the ratio of the applied voltage magnitude to the rotational velocity of the armature of the d-c motor;
b. function generator means responsive to said first signal for producing a second signal representative of the magnitude

of current which would exist in the series field of the d-c motor when the voltage-to-velocity ratio of the motor is the same as that indicated by said first signal;

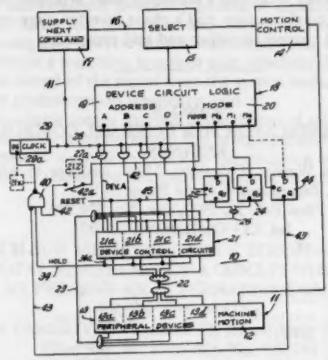
c. second means responsive to the status signals for developing a multiplying factor that is unity when the defined motor operating state is such that field current would equal armature current and exceeds that unity during field weakening states of the motor; and

d. third means responsive to said second signal and to said multiplying factor for producing a third signal representative of the product of field current and said multiplying factor.

4,090,120
METHOD AND MEANS FOR CONTROLLING ENERGIZATION BY COMMANDS

Albert C. Leenhouts, Harwinton, Conn., assignor to The Superior Electric Company, Bristol, Conn.

Filed May 8, 1975, Ser. No. 575,737
Int. Cl.² G05B *11/18, 19/10*
U.S. Cl. 318—567 **23 Claims**

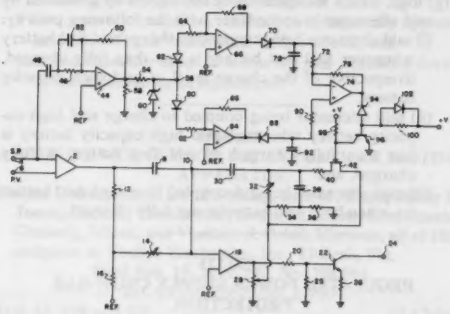


1. A device control system for enabling mode and circuit identifying input commands to control the mode of operation of any one of a plurality of independent control circuits comprising a plurality of control circuits with each circuit having an output that is capable of assuming one of two different states dictated by the mode input commands and with each circuit being uniquely identifiable by circuit identifying input commands, means for receiving a mode input command of one state, means for receiving an identifying input command uniquely identifying one of the circuits, means for shifting the state of the output of the one identified circuit to the state dictated by the mode input command, means for retaining the state of the one control circuit output until input commands are received which both dictate a different state and have the same unique identifying command and in which there is a series of sequential input commands, supply means for sequentially supplying input commands in the absence of a stopping signal, in which a feedback signal means is associated with the one identified control circuit for receiving a feedback signal shiftable between two states, in which there are signal means in the one control circuit responsive to one state of the feedback signal for supplying a stopping signal to the supply means only for the duration that the one state of the feedback signal is received and in which an input mode command dictates the state of the feedback signal to which the signal means is to be responsive.

4,090,121
CONTROL CIRCUIT

Robert A. Nelson, Souderton, and Glenn Saul, Ambler, both of Pa., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 9, 1976, Ser. No. 721,761
Int. Cl.² G05B *11/36*
U.S. Cl. 318—610 **7 Claims**



1. In a controller circuit having means for comparing a measured variable signal with a set-point to produce an error signal, and having means to produce at least derivative characterization of said error signal, said derivative characterization means including an R-C derivative network connected in a feedback loop of said controller circuit, the improvement comprising

auxiliary control means responsive to changes in said set-point signal to selectively inhibit the operation of said derivative characterization means,

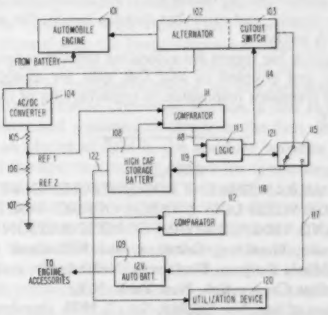
said auxiliary control means including a detector circuit connected to be responsive to changes in said set-point signal to provide an auxiliary control signal, and

means responsive to said auxiliary control signal to effect the inhibiting of the operation of said R-C derivative network.

4,090,122
DUAL BATTERY CHARGER WITH LOGIC MEANS

Walter W. Hoinski, Norristown, Pa., assignor to Power Systems Development Corp., Wilmington, Del.

Filed Mar. 10, 1977, Ser. No. 776,276
Int. Cl.² H02J *7/14*
U.S. Cl. 320—6 **3 Claims**



1. An electric power system associated with a motor vehicle comprising:

(a) an engine associated with the vehicle;

(b) an alternator driven by said engine to generate electricity;

(c) a first battery for operating components of said vehicle including said engine;

CHARACTERIZED BY

(d) a high capacity battery carried by said vehicle;

(e) first means for evaluating the charge level of said first battery;

(f) second means for evaluating the charge level of said high capacity battery; and

(g) logic means for distributing the electricity generated by said alternator in accordance with the following priority:

(i) said alternator being coupled to charge said first battery whenever said first battery is less than fully charged, irrespective of the charge level of said high capacity battery,

(ii) said alternator being coupled to charge said high capacity battery whenever said high capacity battery is less than fully charged, if said first battery is fully charged, and

(iii) said alternator being decoupled from both said batteries when both said batteries are fully charged.

4,090,123

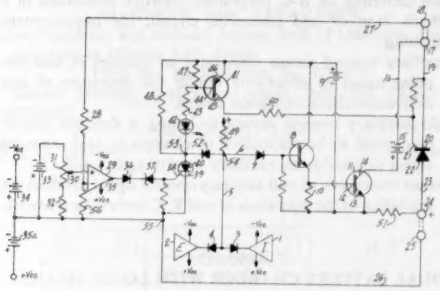
REGULATED POWER SUPPLY CROW-BAR PROTECTION

John Kiviranna, Flushing, N.Y., assignor to Forbro Design Corp., New York, N.Y.

Filed Nov. 11, 1976, Ser. No. 740,962

Int. Cl.[2] G05F *1/58*

U.S. Cl. 323—8 **6 Claims**



1. In a voltage/current regulated power supply comprising a source of unregulated voltage; at least one series pass transistor; at least one driver transistor for driving said series pass transistor; a current control amplifier; a voltage control amplifier; an OR gate for coupling said amplifiers to said driver transistor; first crow-bar means for crow-barring the output of the power supply; and crow-bar driving means; the improvement which includes;

second crow-bar means for activating said crow-bar driving means and coupled to said OR gate for disabling said driver transistor responsive to crow-barring of the power supply.

4,090,124

CIRCUIT ARRANGEMENT FOR SWITCHING A TUNING VOLTAGE WITH LOW SWITCH OFFSET VOLTAGES AND TEMPERATURE COMPENSATION

Klaus Kroner, Hamburg, Germany, and Wilhelmus Antonius Joseph Marie Zwijsen, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

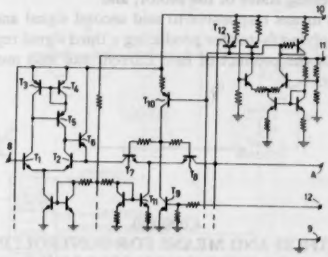
Continuation of Ser. No. 395,019, Sep. 7, 1973, abandoned. This application Jun. 23, 1976, Ser. No. 698,870

Claims priority, application Germany, May 25, 1973, 2326655; Sep. 9, 1972, 2244283

Int. Cl.[2] H03J *5/24*

U.S. Cl. 323—19 **5 Claims**

1. A circuit for supplying a tuning voltage to a voltage variable reactance tuning element from a variable voltage source, said circuit comprising input means for receiving said variable voltage and impedance converter switching means for selectively applying said tuning voltage to said element, said converter and switching means comprising a differential amplifier coupled to said input means and having a pair of transistors each having emitter, base, and collector electrodes, a switching current source coupled to said transistors, and feedback means



for insuring substantially equal current flow in said transistors comprising a current mirror coupled to said collectors of said transistors and a feedback amplifier coupled to the collector of one of said transistors, said feedback amplifier comprising a current amplifier including a transistor stage arranged in common emitter configuration, and a phase inverter stage coupled between said current amplifier and said transistors.

4,090,125

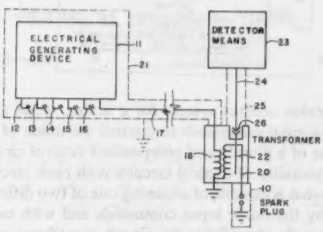
IGNITION INDICATOR FOR INTERNAL COMBUSTION ENGINES

Ralph Selden Warner, Columbus, Miss., assignor to AMBAC Industries, Incorporated, Carle Place, N.Y.

Filed Feb. 22, 1977, Ser. No. 770,296

Int. Cl.[2] G01R *13/42, 23/00*

U.S. Cl. 324—15 **11 Claims**



1. An ignition indicator system for an internal combustion engine having at least one spark plug for each cylinder and electrical generating means for generating pulses in synchronism with operation of the engine, the ignition indicator system comprising:

connecting means for providing a connection from said spark plug to said electrical generating means including a transformer having a primary circuit connected to said generating means and a secondary circuit including the spark plug;

a sensor element mounted with said transformer for having indirect coupling between the secondary circuit of said transformer and said sensor element to generate signals in said sensor element in response to pulses applied to said transformer, and

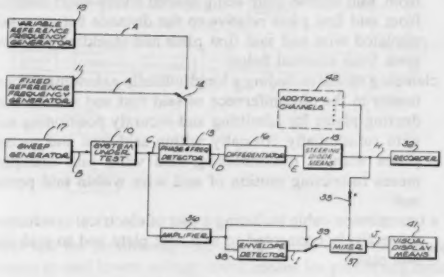
terminal means to connect said sensor element to detector means for providing an indication of the operation of said secondary circuit.

4,090,126

FREQUENCY MARKER GENERATOR

Charles Poticha, 5516 W. 139th St., Hawthorne, Calif. 90250, and Andrew K. Laird, 6317 Esplanade, Playa del Rey, Calif. 90291

Filed Sep. 13, 1976, Ser. No. 722,453
Int. Cl.[2] G01R 27/00
U.S. Cl. 324—57 SS 31 Claims



1. A frequency marker system for providing frequency marker signals to the output of a system under test comprising:

reference frequency generator means for providing a signal having a predetermined frequency,

phase and frequency detector means coupled to the output of said reference frequency generator means and the system under test, said phase and frequency detector means having two discrete output states, and being operative to provide a transition in output state when the frequency of the output of the signal from the system under test passes the predetermined frequency, and

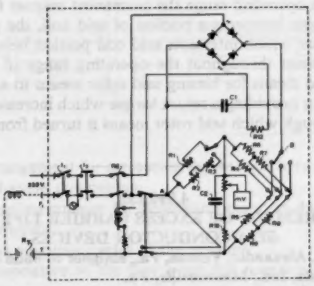
differentiator means coupled to the output of said phase and frequency detector means and being operative to provide a marker signal in response to the transition in the output state of said phase and frequency detector means.

4,090,127

DEVICE FOR MEASURING WITH DIRECT CURRENT THE TOTAL RESISTANCE OF A CIRCUIT WHEN THERE IS ALSO PRESENT AN ALTERNATIVE COMPONENT FROM THE MAINS

Augusto Giustini, Via S. Damaso 51, Roma, Italy (00100)

Filed Sep. 23, 1976, Ser. No. 725,744
Claims priority, application Italy, Sep. 30, 1975, 51585 A/75
Int. Cl.[2] G01R 27/02
U.S. Cl. 324—62 2 Claims



1. An instrument for measuring the total resistance of a circuit comprising:

a Wheatstone bridge circuit having the circuit whose resistance is to be measured connected as one leg thereof;

a resistor having a first terminal and a second terminal;

a bridge rectifier circuit having a first pair of diagonally opposite junctions, one of which is connected to said resistor first terminal, the other of said first pair of diagonally opposite junctions and said resistor second terminal adapted for connection across an alternating voltage source to be supplied with alternating voltage therefrom, said bridge rectifier circuit further having a second pair of diagonally opposite junctions connected across two diagonally opposite junctions of said Wheatstone bridge circuit to supply rectified voltage thereto, whereby said Wheatstone bridge circuit is energized;

a first capacitor coupled across said two diagonally opposite junctions of said Wheatstone bridge circuit; and

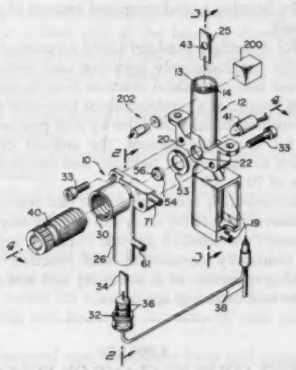
a second capacitor coupled across the null indicating device of said wheatstone bridge circuit.

4,090,128

APERTURE MODULE FOR USE IN PARTICLE TESTING APPARATUS

Ronald O. Simpson; J. David Starling, both of Miami; Bobby D. James, Hialeah; Thomas John Godin, Ft. Lauderdale; Guenter Ginsberg, Miami, and Vladimir J. Drbal, Miramar, all of Fla., assignors to Coulter Electronics, Inc., Hialeah, Fla.

Filed Feb. 15, 1977, Ser. No. 768,864
Int. Cl.[2] G01N 27/00, 21/00
U.S. Cl. 324—71 CP 12 Claims



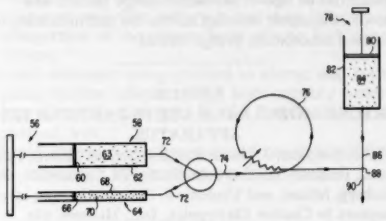
1. An aperture module for use in particle testing apparatus including a container of particulate liquid suspension to be tested, said module comprising, a housing formed of optically clear material and having a first chamber and a second chamber, an aperture holder disposed in the first chamber and having an aperture provided therein, the aperture holder extending into the container with the aperture in communication on one side thereof with the liquid suspension, said first chamber having a wall defining a reduced dimension portion and the aperture being in communication on the side opposite said one side with said reduced dimension portion, a first electrode in the container and a second electrode in the first chamber to establish an electrical field in the aperture between the container and the aperture module, means for connecting the first chamber at an entrance thereof to a source of particle free liquid and means for connecting the reduced dimension portion of the first chamber to fluid moving means to move the suspension from the container through the aperture into the reduced dimension portion of the first chamber, means including electrical leads connected to said electrodes and adapted to extend connections to a detector to respond to electrical measuring signals produced across said electrodes with passage of particles through said aperture, and an objective lens assembly positioned in the second chamber adjacent said wall defining the reduced dimension portion of the first chamber for visually examining the aperture during movement of the suspension therethrough.

4,090,129

STOPPED-FLOW REACTION APPARATUS UTILIZED IN CONJUNCTION WITH CONTINUOUS-FLOW RESISTIVE-PARTICLE COUNTING APPARATUS

Adrian R. L. Gear, Charlottesville, Va., assignor to University of Virginia, Charlottesville, Va.

Filed Jan. 28, 1977, Ser. No. 763,631
Int. Cl.[2] G01N *27/00*
U.S. Cl. 324—71 CP **10 Claims**



1. Stopped-flow, reaction apparatus for use in conjunction with continuous-flow resistive-particle counting apparatus, comprising:

means for housing a predetermined amount of particles to be counted;

means for housing a predetermined amount of a reactant;

means for simultaneously injecting said particles and said reactant into a common reaction loop having a predetermined length, at a predetermined flow rate so as to facilitate reaction of said particles by said reactant;

means for housing a diluent, the amount of said diluent relative to that of said particles and reactant being in the range of 70 – 500 : 1;

means for injecting said diluent into said reaction loop so as to massively dilute the same and thereby stop the reaction;

continuous-flow resistive particle counting apparatus; and

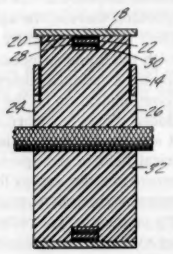
means fluidically connecting said reaction loop to said counting apparatus so as to supply said non-reacting solution to said counting apparatus.

4,090,130

CAPACITIVE COUPLED CLAMP-ON VOLTAGE PROBE

James F. Willenbecher, Jr., East Windsor, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 6, 1976, Ser. No. 747,756
Int. Cl.[2] G01R *15/04*; H01G *3/00*
U.S. Cl. 324—126 **2 Claims**



1. A probe adapted to be clamped about an insulated conducting wire for measuring the potential of said wire comprising:

a first thin cylindrical plate of conductive material adapted to substantially surround said insulated wire, said first plate being separated from said insulated wire by a medium having a low dielectric constant, said first plate having a radius which is at least four times the radius of said insulated wire and an axial length much smaller than that of the portion of said insulated wire positioned within said probe so that the capacitance between said first plate and said wire is no more than one third the characteristic capacitance of said wire to minimize the effects of variations in the characteristics of said insulated wire;

a second thin cylindrical plate of conductive material concentrically surrounding said first plate and insulated therefrom, said second plate being spaced a very short distance from said first plate relative to the distance between said insulated wire and said first plate and shielding said first plate from external fields;

clamping means including a longitudinally extending discontinuity in the circumference of said first and second conducting plates for admitting and securely positioning said wire substantially coaxially within said first and second plates without disconnecting said wire, said clamping means restricting motion of said wire within said probe; and

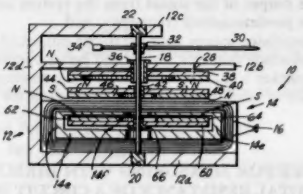
a transmission cable including a pair of electrical conductors respectively connected to said first plate and to said second plate.

4,090,131

MOVING MAGNET METER HAVING A CLOSED MAGNETIC CIRCUIT ROTOR

Joseph A. Mas, 3 Maple Way, Woodbury, N.Y. 11797

Continuation-in-part of Ser. No. 708,495, Jul. 26, 1976, abandoned. This application Nov. 4, 1976, Ser. No. 738,849
Int. Cl.[2] G01R *5/14*
U.S. Cl. 324—146 **72 Claims**



48. A cogless meter movement comprising a stationary coil for conducting a current therethrough; rotor means mounted for rotation relative to said coil, said rotor means having a closed magnetic circuit with a working gap and a fixed reluctance independent of rotor displacement for conducting a predetermined constant permanent magnet flux therethrough, said rotor means being mounted such that for any displacement within the operating range the permanent magnet flux in said working gap intersects a portion of said coil, the permanent magnet flux which intersects said coil portion being substantially constant throughout the operating range of said rotor means; and means for biasing said rotor means to a zero position and for providing a return torque which increases with the angle through which said rotor means is turned from said zero position.

4,090,132

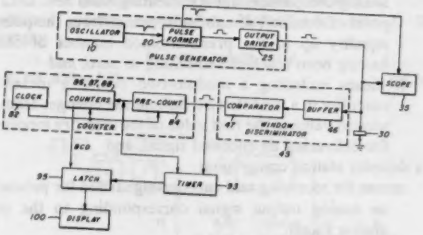
MEASUREMENT OF EXCESS CARRIER LIFETIME IN SEMICONDUCTOR DEVICES

William J. Alexander, Verona, Pa., assignor to Solid State Measurements, Inc., Monroeville, Pa.

Filed Mar. 10, 1976, Ser. No. 665,571
Int. Cl.[2] G01R *31/26*
U.S. Cl. 324—158 D **12 Claims**

1. A system for measuring excess carrier lifetime in semiconductor devices, said system comprising a pulse generator for generating a series of substantially rectangular current pulses and applying said current pulses repetitively to a device to be measured, means for observing the open circuit voltage across

said device upon termination of each current pulse including comparator means for establishing upper and lower voltage levels separated by a preset voltage difference, means controlled by said comparator means for initiating an output pulse when the voltage across said device falls to said upper voltage



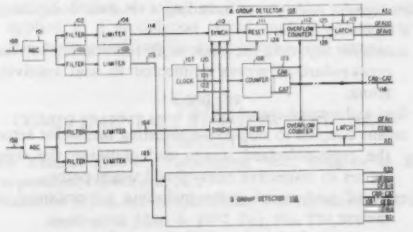
level and for terminating said output pulse when the voltage decays to said lower voltage level, means for permitting initiation of an output pulse only after termination of a current pulse, and means controlled by the width of said output pulses for determining and visually displaying the numerical value of said lifetime.

4,090,133

DIGITAL TIME INTERVAL SENSOR USING A FREE RUNNING COUNTER AND A CYCLE COUNTER WITH ONLY THE LATTER BEING RESET AT EACH EVENT

Battle Hargrove Klyce, Middletown; Frank Peter Sansone, Freehold, and Roger Mark Ziegler, Tinton Falls, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 6, 1977, Ser. No. 757,373
Int. Cl.[2] G04F *9/00*; G01R *23/02*; G01S *9/04*
U.S. Cl. 324—186 **5 Claims**



1. An arrangement for measuring the interval between a first and second event comprising:

a free running counter for generating numbers during each cycle thereof;

means for counting cycles of the counter;

means responsive to the first event for resetting the cycle counting means to an initial count and reading a first number including the current number generated by the counter without resetting the counter;

means responsive to the second event for reading a composite number comprising the current cycle count and the current number generated by the counter; and

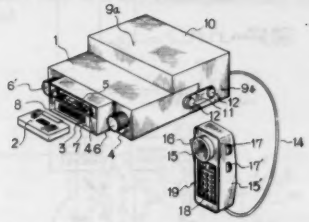
means for determining the difference between said first and said composition numbers.

4,090,134

COMBINATED TRANSCEIVER, CARTRIDGE TAPE PLAYER AND RADIO UNIT

Kazuo Arai, Kitamoto, Japan, assignor to Nissan Denshi Kabushiki Kaisha, Ohmiya, Japan

Filed Apr. 20, 1976, Ser. No. 678,544
Claims priority, application Japan, Dec. 29, 1975, 50/177778
Int. Cl.[2] F16H *35/18*; H03J *5/00*
U.S. Cl. 325—15 **5 Claims**



1. The combination comprising:

a combined radio broadcast receiver and tape player including a first housing adapted to be connected into the dashboard of an automobile, a radio receiver circuit in said housing, a cartridge tape player in the housing having an opening at a front side of the housing through which a tape cartridge is insertible, and control means at said front side of said housing for operating said radio receiver and said tape player;

a separately formed second housing connected to the rear of said first housing;

transmitting and receiving circuitry of a transceiver in said second housing;

said second housing having a rear portion extending generally vertically at the back of said first housing and having an upper portion extending forwardly from said rear portion above said first housing;

a manually held unit including a microphone and manually operable means for controlling said microphone and said transmitting and receiving circuitry of said transceiver; and

a flexible electrical cord extending from said transceiver in said second housing to said microphone unit.

4,090,135

WIRELESS FSK TECHNIQUE FOR TELEMETERING UNDERGROUND DATA TO THE SURFACE

Arnold J. Farstad, Boulder, and Carl Fisher, Jr., Louisville, both of Colo., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jun. 29, 1976, Ser. No. 741,101
Int. Cl.[2] H04B *13/02*
U.S. Cl. 325—28 **6 Claims**

1. A FSK telemetery system for transmitting data pulses of different frequencies through the earth and for receiving and converting these transmitted pulses to binary data comprising:

means for forming continuous narrow bandwidth pulses having either of two distinct low frequencies with each having its own total duty cycle;

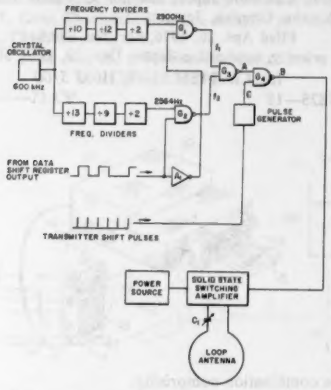
means for shortening the time duration of both of said formed continuous pulses to form pulses of tone bursts with the same distinct frequencies over no more than about ten percent of their respective total duty cycles;

means for transmitting either of the two formed tone bursts through the earth;

portable self contained power supply means for providing power to said forming, shortening and transmitting means;

means for receiving said transmitted tone bursts after then have transversed through the earth, said receiving means having an exclusive OR circuit to reject received pulses

when both of the distinct low frequency pulses are simultaneously present; and



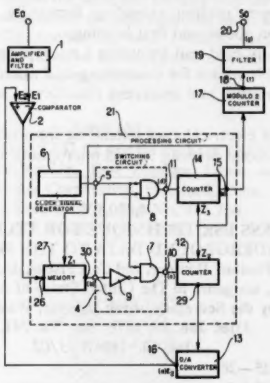
digital storage data means for storing said received pulses as binary representations thereof.

4,090,136

METHOD AND APPARATUS FOR CODING A SIGNAL

Christian Magnien, Perros-Guirec, and Fernand Secher, Lannion, both of France, assignors to Societe Lannionnaise d'Electronique Sle-Citerel S.A., Lannion, France

Filed Jan. 29, 1976, Ser. No. 653,639
Claims priority, application France, Feb. 28, 1975, 75 06395
Int. Cl.[2] H03K *13/22*
U.S. Cl. 325—38 B **7 Claims**



1. A transmission system for translating an analog input signal having a fundamental frequency into an encoded signal and for decoding said encoded signal into an analog output signal, said system comprising:

an encoder station comprising:

a. a signal comparator means for comparing the analog input signal with an analog comparison signal,

b. a memory means for storing a first value until the analog comparison signal reaches a point of equality with the analog input signal and a second value upon the analog comparison signal reaching the point of equality,

c. a clock generating means for generating clock signal pulses having a relatively high frequency compared to the fundamental frequency of the analog input signal,

d. a signal counting means for counting the clock signal until the analog comparison signal reaches the point of equality with the analog input signal, for counting the clock signal from the point of equality up to a predetermined number of counts, and for resetting the memory means to the first value when the predetermined number of counts has been reached,

e. a signal generating means for generating the analog comparison signal from the counted clock signal, said analog comparison signal increasing from zero until the point of equality, remaining constant from the point of equality up to the predetermined number of counts having been reached and falling to zero, and

f. means including a modulo-two counting means for counting in a modulo two fashion the changes from the second value to the first value of the memory means and for delivering an encoded signal, and

a decoder station comprising:

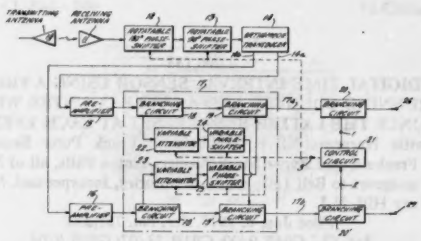
means for receiving said encoded signal and for producing an analog output signal corresponding to the input analog signal.

4,090,137

SYSTEM FOR COMPENSATING CROSS-POLARIZED WAVES TO ATTENUATE CROSSTALK

Shoji Soma, and Ikuro Sato, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Mar. 3, 1976, Ser. No. 663,221
Claims priority, application Japan, Mar. 3, 1975, 50-25844
Int. Cl.[2] H04B *1/00*
U.S. Cl. 325—60 **12 Claims**



1. A crosstalk compensation system for communications systems using cross-polarized waves transmitted together with pilot signals; said system including a receiver comprising:

a receiving antenna;

means for adjusting the phase angle relationship between the cross-polarized waves connected to said receiving antenna;

first and second signal paths;

means coupled to said phase adjusting means for separating the cross-polarized waves and coupling the separated waves to respective ones of said signal paths;

each of said signal paths including a combining circuit means;

means in each signal path for extracting a portion of the signal in each signal path;

attenuating means coupled between the extracting means of each signal path and the combining means of the other signal path for attenuating the extracted signal;

each combining means combining the signal in its associated signal path with the attenuated signal from the attenuating means coupled thereto to remove the unwanted crosstalk component from the signal appearing at the output of each combining means;

control means responsive to the outputs of said combining means for developing control signals for adjusting the attenuation level of said attenuating means and the phase shift applied to the received waves by the phase adjusting means.

4,090,138
FSK TRANSMITTER HAVING FREQUENCY BAND-LIMITATION

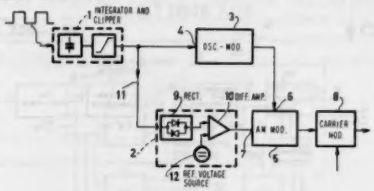
Johannes O. Voorman, and Johan M. Schmidt, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 21, 1976, Ser. No. 698,407

Claims priority, application Netherlands, Jul. 2, 1975, 7507858

Int. Cl.² H04B *1/04*

U.S. Cl. 325—163 **6 Claims**



1. An FSK transmitter having a frequency band limitation, said transmitter comprising:

a. a first device having an input means for receiving an information signal comprising square pulses, and an output means to generate a control signal comprising substantially symmetrical trapezoidal pulses having a recurrence time equal to that of said square pulses;

b. a second device having an input coupled to said first device output means, and an output means to generate a direct voltage signal the direct voltage value of which shows a positive pulsatory variation each time during the occurrence of the rising and falling edges of the substantially symmetrical trapezoidal pulses of the control signal;

c. an oscillator modulator including a substantially instantaneously linearly controllable gyrator having a frequency control input to which the control signal supplied by the said first device is applied as a frequency modulation signal, and an output means to generate an FSK output signal; and

d. an amplitude modulator having a first input to which the FSK output signal of said gyrator is applied and having a second input to which the direct voltage signal of the said second device showing positive pulsatory variations is applied as a modulation signal, and having an output means for providing the band-limited FSK signal.

4,090,139
COMPLEMENTARY SYMMETRY FET MIXER CIRCUITS

Merle Vincent Hoover, Flemington, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 684,237, May 7, 1976, abandoned. This application Mar. 4, 1977, Ser. No. 774,274

Int. Cl.² H04B *1/28*

U.S. Cl. 325—451 **17 Claims**

1. A mixer comprising, in combination:

first and second terminals between which an operating voltage may be applied;

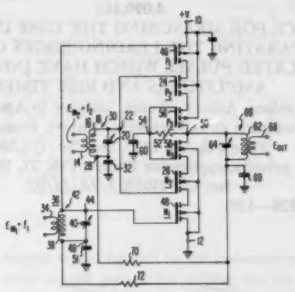
a circuit output terminal;

six field effect transistors, first and second and third of these transistors being of a first conductivity type and fourth and fifth and sixth of these transistors being of a second conductivity type complementary to said first conductivity type, each transistor having a conduction path between input and output electrodes and having a control electrode, the conduction paths of said first and second and third transistors being serially connected between said first terminal and said output terminal, and the conduction paths of said fourth and fifth and sixth transistors being serially connected between said second terminal and said output terminal;

means for quiescently biasing all of said transistors in the linear region of their operating range including:

means for applying similar quiescent potentials to the control electrodes of said first and fourth transistors thereby to connect them as a first complementary conduction pair,

means for applying similar quiescent potentials to the control electrodes of said second and fifth transistors thereby to connect them as a second complementary conduction pair, and



means for applying similar quiescent potentials to the control electrodes of said third and sixth transistors, thereby to connect them as a third complementary conduction pair;

means for applying a first input signal at frequency f_1 to the control electrodes of said first and fourth transistors;

means for applying a second input signal at frequency f_2 to the control electrodes of said second and fifth transistors; and

a tuned output circuit coupled between said output terminal and another circuit point, said circuit being tuned to the one of the output signal frequency components of interest available at said output terminal.

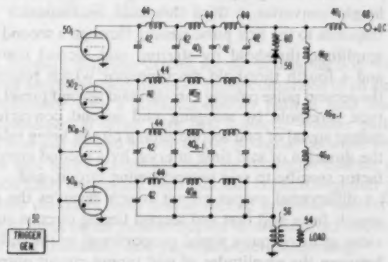
4,090,140
CONSTANT CURRENT CHARGING CIRCUITS FOR HIGH ENERGY MODULATORS

John L. Carter, Ocean, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 17, 1977, Ser. No. 759,684

Int. Cl.² H03K *1/00, 3/04*

U.S. Cl. 328—65 **9 Claims**



1. In a pulse generating circuit for supplying pulses to a load and having a plurality of parallel energy storage networks including capacitance means adapted to be charged from a power source through charging inductor means and subsequently discharged through output means coupled to said load and a first storage network connected to said power source

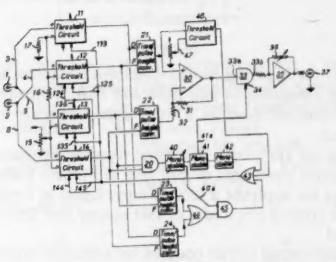
through a first charging inductor, the improvement comprising, a second energy storage network, and a second charging inductor connected in series between said second energy storage network and said first charging inductor, said charging inductors providing constant current charging for said energy storage networks and having a cumulative distributed inductance value which when combined with the total capacitance of said energy storage networks provides an output pulse to said load having a pulsewidth equal to the interpulse period between consecutive discharges.

4,090,141

DEVICE FOR MEASURING THE TIME INTERVAL SEPARATING THE LEADING EDGES OF TWO CORRELATED PULSES WHICH HAVE INDEPENDENT AMPLITUDES AND RISE TIMES

Michel Leblanc, Antony, France, assignor to Agence Nationale de Valorisation de la Recherche (Anvar), France

Filed Feb. 23, 1977, Ser. No. 771,306
Claims priority, application France, Feb. 27, 1976, 76 05469
Int. Cl.² H03K *5/18, 13/03*
U.S. Cl. 328—129 **12 Claims**



1. A device for measuring the time interval separating the leading edges of first and second correlated pulses which have independent amplitudes and rise times, said device comprising:

(a) a first timing circuit including a first time to pulse height converter, a first threshold discriminator which responds to the first pulse passing through a first preset amplitude threshold by starting said first converter, and a second threshold discriminator which responds to the second pulse passing through said first preset amplitude threshold by stopping said first converter, the output signal of said first timing circuit being related to the duration of said time interval by a first conversion factor specific to said first timing circuit;

(b) a second timing circuit including a second time to pulse height converter, a third threshold discriminator which responds to the first pulse passing through a second preset amplitude threshold by starting said second converter, and a fourth threshold discriminator which responds to the second pulse passing through said second preset amplitude threshold by stopping said second converter, the output signal of said second timing circuit being related to the duration of said time interval by a second conversion factor specific to said second timing circuit; and

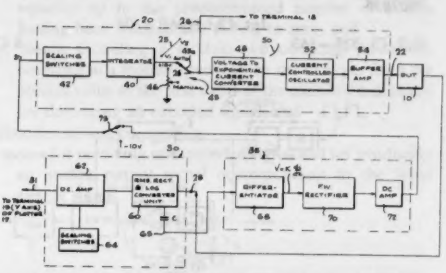
(c) a differential output circuit which receives the output signals from said first and second timing circuits and provides at its output a signal proportional to the difference between the amplitudes of said timing circuit output signals, the arrangement of said first and second timing circuits being such that the ratio of said first to said second preset amplitude threshold is equal to the ratio of said second to said first timing circuit conversion factor, whereby said output signal from said differential output circuit is proportional to the duration of said time interval.

4,090,142

AUTOMATIC FREQUENCY RESPONSE PLOTTING SYSTEM

Bradley J. Plunkett, Van Nuys, Calif., assignor to United Recording Electronic Industries, North Hollywood, Calif.

Filed Jan. 15, 1976, Ser. No. 649,430
Int. Cl.² H03B *3/04*
U.S. Cl. 328—132 **11 Claims**



1. For use with a first circuit of the type providing an AC output signal at a constant amplitude and a frequency variable at a selected sweep rate, and with a second circuit of the type adapted to receive an AC signal at a variable amplitude, an arrangement comprising:

first control means coupled to said second circuit and responsive to the amplitude of the AC signal, received by said second circuit, for providing a first signal which is a function of the rate of change of the amplitude of the AC signal received by said second circuit; and

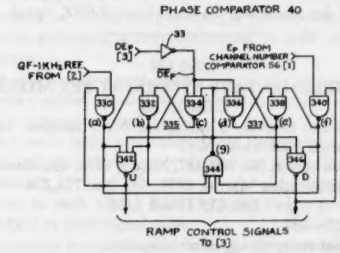
second control means coupled to said first control means and to said first circuit for controlling the sweep rate of the frequency of the AC signal provided by said first circuit, as a function of said first signal.

4,090,143

DIGITAL PHASE COMPARATOR WITH RESET

Richard G. Merrell, Darien, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Jan. 14, 1977, Ser. No. 756,166
Int. Cl.² H03D *13/00*
U.S. Cl. 328—134 **6 Claims**



1. A digital phase-frequency comparator comprising a plurality of interconnected logic gates having a first input for receiving an adjustable pulse signal, a second input for receiving a reference pulse signal and first and second outputs selectively indicating the frequency-phase relationship between the adjustable signal and reference signal;

said phase-frequency comparator having a plurality of both stable states and unstable states, and often temporarily producing erroneous output information; and

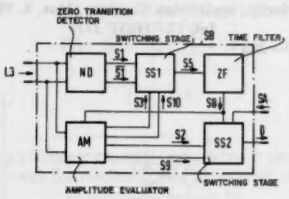
reset means for instantaneously forcing said phase-frequency comparator into one of its stable states such that said outputs present correct information about the frequency

relationship between said adjustable pulse signal and said reference pulse signal within one cycle of the higher frequency one of said pulse signals.

4,090,144
CIRCUIT ARRANGEMENT FOR RECOGNIZING ZERO TRANSITIONS OF SIGNALS

Franz Jenik, Munich, and Peter Wentzel, Augsburg, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 2, 1976, Ser. No. 710,874
Claims priority, application Germany, Aug. 21, 1975, 2537264
Int. Cl.[2] H03K *5/18*
U.S. Cl. 328—150 **6 Claims**



1. A circuit arrangement for recognizing and time checking zero transitions of data signals, comprising:

a zero transition detector for receiving the data signals and producing rectangular signals in response to zero transitions of the data signals, said zero transition detector comprising means for producing said rectangular signals as complementary inverted and non-inverted rectangular pulses;

an amplitude evaluator for receiving the data signals and producing amplitude signals which indicate that a data signal is, prior to a zero transition, greater than a given threshold value, said amplitude evaluator comprising means for emitting said amplitude signals as first and second amplitude signals in response to overshoot and undershoot of respective positive and negative threshold values;

a switching stage connected to said zero transition detector and to said amplitude evaluator and operable to emit further signals in response to the presence of both rectangular and amplitude signals, said switching stage comprising a first NOR gate connected to receive said non-inverted rectangular pulses and said first amplitude pulses, a second NOR gate connected to receive said inverted rectangular signals and said second amplitude pulses, and a third NOR gate connected to said first and second NOR gates for producing said further signals; and

a time filter connected to said switching stage and responsive to said further signals to emit corresponding output pulses only when the interval of time between two changes in said further signals exceeds a given duration of time.

4,090,145
DIGITAL QUADRATURE DEMODULATOR

Joseph A. Webb, 6317 W. Mississippi Pl., Lakewood, Colo. 80226

Continuation-in-part of Ser. No. 809,720, Mar. 24, 1969, abandoned, and Ser. No. 30,169, Apr. 20, 1970, abandoned. This application Feb. 8, 1972, Ser. No. 224,523
Int. Cl.[2] H03D *1/00, 3/00, 5/00*
U.S. Cl. 329—1 **1 Claim**

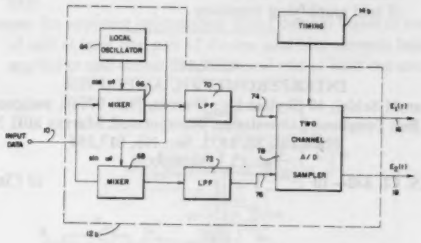
1. A demodulation system for demodulating an angle modulated input signal comprising:

quadrature analog-to-digital sampling means for providing a first quadrature sample signal $E_1(t)$ of said input signal and a second quadrature sample signal $E_2(t)$ of said input signal, said sample signals being defined by the equations:

$E_1(t) = A_1\cos\omega t + \phi$

$E_2(t) = A_1\sin\omega t + \phi$

where A_1 is the vector representing the instantaneous amplitude of the input signal, ω is the instantaneous frequency of the input signal, t is the time when the sample signal is taken, and ϕ is the initial phase of the input signal; digital processing means for operating on a pair of said quadrature sample signals

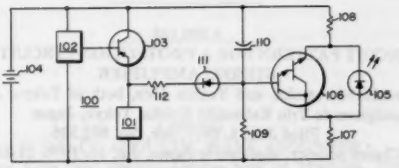


to provide an output signal related to the instantaneous phase angle of said input signal; means for mixing the input signal with a locally generated signal twice, once in each of two channels; means for shifting the phase of a locally generated signal by $\pi/2$ radians in one channel; means for filtering the sum and residual original frequencies of said mixed signals to obtain difference frequencies in quadrature phase relationship to one another; and means for simultaneously sampling said difference frequencies to form an output signal related to the instantaneous phase angle of said input signal.

4,090,146
CLIPPING INDICATOR CIRCUIT FOR TRANSISTOR AMPLIFIER

Daniel Scott Pearce, Lancaster, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Jun. 29, 1977, Ser. No. 811,322
Int. Cl.[2] H03F *17/00*
U.S. Cl. 330—2 **7 Claims**



1. A clipping indicator circuit for use in conjunction with a transistor amplifier, said amplifier being comprised of an amplifying transistor with a collector-emitter path, a load electrically connected in series with said collector-emitter path, at least a first and second source of d-c potential between which sources said series connected load and collector-emitter path are electrically connected such that said collector-emitter path forwardly conducts from first to second potential source, and a bias and input signal means coupled to said sources and to the base of said transistor, said circuit further comprising:

a switching transistor with a collector-emitter path and a base-emitter path;

a light-emitting diode electrically connected in parallel with the collector-emitter path of said switching transistor and having forward conducting path directed parallel to the forward conduction of said collector-emitter path of said switching transistor;

a current-limiting resistor electrically connected between said first source of electrical potential and the collector of said switching transistor;

a level-determining means electrically connected between said second source of electrical potential and the emitter of said switching transistor;

a bias resistor electrically connected between said second source of electrical potential and the base of said switching transistor; and

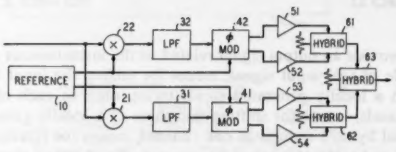
a sensing diode electrically connected between said base of said switching transistor and a junction in said series connection between said load and said collector-emitter path of said amplifying transistor.

4,090,147

INTERFEROMETRIC AMPLIFIER

Harold Seidel, 40 Skyline Dr., Warren, N.J. 07060, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jul. 20, 1977, Ser. No. 817,354
Int. Cl.² H03F *3/38*
U.S. Cl. 330—10 **10 Claims**



10. An interferometric amplifier responsive to an amplitude modulated input signal, developing constant amplitude phase modulated signals that are amplified and passively combined to form an amplitude modulated signal CHARACTERIZED BY:

circuitry for developing two constant amplitude phase modulated signals whose sum lies along a first reference signal approximating the instantaneous frequency of said input signal and equals the projection of said input signal on said first reference signal; and

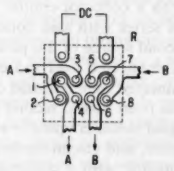
circuitry for developing two constant amplitude phase modulated signals whose sum lies along a second reference signal orthogonal to said first reference signal and equal to the projection of said input signal on said second reference signal.

4,090,148

CIRCUIT PATTERN FOR A PROTECTION CIRCUIT OF A STEREO AMPLIFIER

Hiroshi Muratsuka, and Yoshio Aida, both of Tokyo, Japan, assignors to Trio Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 1, 1977, Ser. No. 802,526
Claims priority, application Japan, Jul. 16, 1976, 51-84581
Int. Cl.² H03F *3/68*
U.S. Cl. 330—207 P **3 Claims**



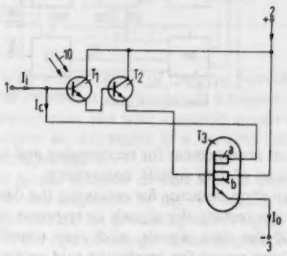
1. In a stereo amplifier protective device having at least two relay circuits per channel where each circuit includes a pair of contact points, the improvement of the contact points in a first one of the channels being so disposed with respect to one another that the signal current flowing through a first pair of the contact points in said first channel is in a direction substantially opposite to that flowing through a second pair of the contact points in said first channel to thereby enhance channel separation in the stereo amplifier.

4,090,149

INTEGRATED DEGENERATIVE AMPLIFIER

Gerhard Krause, Rosenheim, Egarten, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 12, 1976, Ser. No. 731,432
Claims priority, application Germany, Nov. 5, 1975, 2549667
Int. Cl.² H03F *3/14*
U.S. Cl. 330—293 **8 Claims**



1. In an integrated circuit degenerative feedback current amplifier having an energy supply, at least two amplifier stages including an input amplifier stage in a common collector configuration connected to said energy supply and a single feedback branch, said branch being degeneratively directly connected from an output of the amplifier to an input of the input amplifier stage, the improvement comprising an active element of the last amplifier stage having an output circuit subdivided for a subdivision of the output current into first and second partial currents, the first partial current being connected to the feedback branch and the second partial current being connected to the amplifier output.

4,090,150

HIGH DYNAMIC PHASE-ACCURATE ALTERNATING VOLTAGE AMPLIFIER OPERATING AS A LOGARITHMIC AMPLIFIER FOR MAINTAINING AMPLITUDE INFORMATION

Erwin Vachenauer, Haar, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

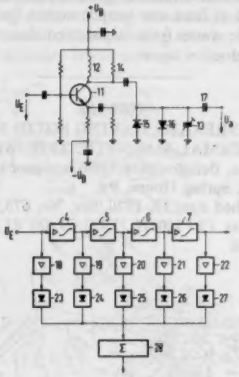
Filed Jan. 24, 1977, Ser. No. 761,645
Claims priority, application Germany, Feb. 17, 1976, 2606270
Int. Cl.² H03F *3/04*
U.S. Cl. 330—302 **4 Claims**

1. A multi-stage limiter amplifier for amplifying an ac voltage of a specific frequency which may have been subjected to large level fluctuations, comprising:

a plurality of serially-connected amplifier stages each including a feedback amplifier and a pair of limiter diodes connected to the output of said feedback amplifier, said diodes connected in opposite polarity and in parallel and having a symmetrical limiting effect,

each of said amplifier stages including a transistor amplifier circuit comprising an output circuit including a parallel

resonant circuit, a damping impedance strongly damping said parallel resonant circuit, said parallel resonant circuit



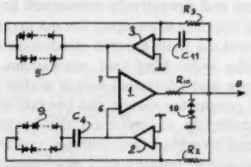
including a trimmer capacitor connected in parallel to said limiter diodes for rendering said impedance capacitive.

4,090,151

TEMPERATURE SENSING DEVICE FOR PRODUCING ALTERNATING ELECTRIC SIGNALS WHOSE PERIOD IS A FUNCTION OF A TEMPERATURE

René Presset, and Michel Torregrosa, both of Portes les Valence, France, assignors to Crouzet, Paris, France

Filed Jan. 19, 1977, Ser. No. 760,577
Claims priority, application France, Jan. 28, 1976, 76 02508
Int. Cl.[2] G01K *7/22*
U.S. Cl. 331—66 **3 Claims**



1. A temperature sensing device for producing an alternating electric signal the period of which is linear function of the temperature being measured, said device comprising:

a first sensing probe comprising at least two semiconductor junctions connected in parallel and poled in opposition to each other; and

a multivibrator comprising an amplifier-comparator having first and second inputs and an output, said first input connected to said first sensing probe, a first resistor connected between said first sensing probe and said output, a first capacitor and a second resistor, said first capacitor and said second resistor connected in series between said second input and said output.

4,090,152

PUSH-PULL OSCILLATOR CIRCUIT WITH POWER COMBINING CAVITY

Michael Dydyk, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 5, 1977, Ser. No. 813,054
Int. Cl.[2] H03B *7/14*
U.S. Cl. 331—102 **3 Claims**

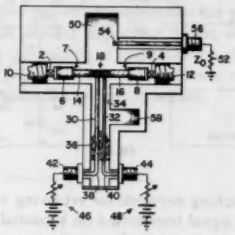
1. A push-pull high power microwave oscillator comprising in combination:

at least one coaxial transmission line, said coaxial line having a center conductor, said center conductor being of two parts and having two extremities and a direct current block, said direct current block being located between said two extremities and two parts of said center conductor of said coaxial line;

at least one pair of diodes;

means for mounting said at least one pair of diodes, a first of said at least one pair of diodes being mounted at a first of said two extremities of said at least one coaxial line, a second of said at least one pair of diodes being mounted at a second of said two extremities of said at least one coaxial line;

means for applying independent direct current biases to each of said at least one pair of diodes, said bias currents being applied to said center conductors of said at least one coaxial line at points lying between each of said at least one pair of diodes and said direct current block;



first cavity means for coupling microwave energy from each of said at least one pair of diodes, said first cavity means being coupled to said at least one coaxial line in the near vicinity of said means for applying bias, said first cavity means being resonant at a frequency of operation, f_o;

second cavity means for coupling microwave energy from each of said at least one diode pair, said second cavity means being resonant at said frequency, f_o, said second cavity means being coupled to said means for applying bias at a point remote from said at least one coaxial line by an add number multiple of one-fourth wavelengths as measured at said frequency, f_o; and

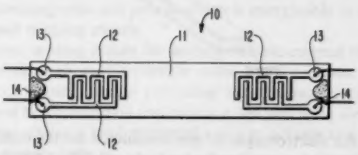
means for coupling microwave energy from said first cavity.

4,090,153

SURFACE ACOUSTIC WAVE ABSORBER

Minoru Toda, and Susumu Osaka, both of Machida, Japan, assignors to RCA Corporation, New York, N.Y.

Filed Jun. 7, 1976, Ser. No. 694,041
Int. Cl.[2] H03H *9/06, 9/26, 9/30*; H01L *41/10*
U.S. Cl. 333—30 R **8 Claims**



1. A surface acoustic wave device comprising a piezoelectric substrate, a pair of transducers having leads on said substrate and a surface acoustic wave absorber comprising an epoxy resin admixed with a powder filler.

4,090,154

MATCHING ARRANGEMENT FOR CONVERTING BI-DIRECTIONAL SIGNALS INTO BINARY SIGNALS

Jean Lucien Alexandre Hauchart, Noisy-le-Sec, France, assignor to Compagnie Honeywell Bull (Societe Anonyme), Paris, France

Filed Apr. 5, 1976, Ser. No. 673,947
Claims priority, application France, Apr. 18, 1975, 75 12201
Int. Cl.² H03H 7/38
U.S. Cl. 333—32 **10 Claims**

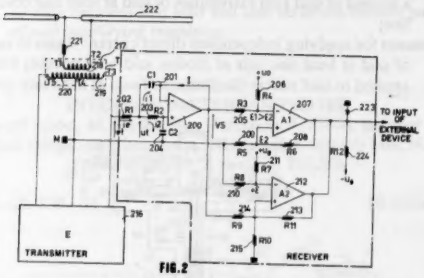


FIG.2

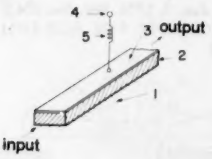
1. A matching network for receiving a high frequency bi-directional signal transmitted on a coaxial cable comprising a magnetic-induction transformer having a first winding connected to the coaxial cable and a second winding magnetically coupled to the first winding, an active filter having a second order transfer function, said second winding being connected to the input of said active filter, a comparator having a first input and a second input, the output of said active filter being connected to said first and said second inputs such that the bi-directional signals are converted into binary signals, the values of the thresholds of the comparator at its first and its second input being greater in absolute terms than the level of the capacitive noise appearing on the cable, which reappears filtered at the output of said active filter.

4,090,155

TRANSMISSION LINE FOR ELECTROMAGNETIC WAVE

Hiroshi Tateno; Shoei Kataoka, both of Tanashi; Nobuo Hashizume, Kawasaki, and Yasuo Komamiya, Yokohama, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Mar. 22, 1976, Ser. No. 668,986
Claims priority, application Japan, May 12, 1975, 50-54755; May 16, 1975, 50-57249; May 21, 1975, 50-59650; Jun. 5, 1975, 50-67010
Int. Cl.² H01P 1/22, 1/15, 3/08; H03F 3/54
U.S. Cl. 333—80 T **16 Claims**



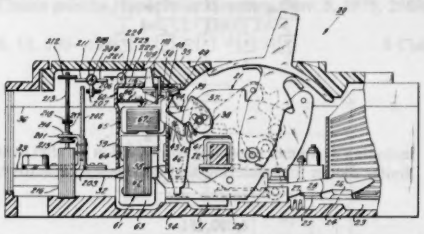
1. An electromagnetic semiconductor device comprising in combination, a semiconductor body exhibiting a negative conductivity under a high electric field, a conductive layer provided on one surface of said semiconductor body, at least one blocking contact provided on the other surface of said semiconductor body, at least one means for applying a reverse biasing voltage between said conductive layer and said blocking contact to produce a depletion layer in said semiconductor body, at least one input means for introducing electromagnetic waves into said semiconductor body in parallel to said conductive layer, and at least one output means for extracting said electromagnetic waves from said semiconductor body in parallel to said conductive layer.

4,090,156

CIRCUIT BREAKER HAVING SOLID STATE AND THERMAL-MAGNETIC TRIP MEANS

Carl E. Gryctko, Bellefontaine, Ohio, assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Apr. 12, 1976, Ser. No. 675,971
Int. Cl.² H01H 75/00, 77/00, 83/00
U.S. Cl. 335—6 **5 Claims**



1. A circuit breaker including cooperating contact means; a spring powered mechanism for opening and closing said contact means; latch means for maintaining said mechanism in a reset position for closing said contact means; main conductor means in series with said contact means; an insulating housing wherein said contact means, said mechanism, said latch means and said conductor means are disposed; a solid state trip means disposed within said housing inductively coupled to said conductor means and operatively connected to said latch means for normally tripping same upon the occurrence of first predetermined overload fault current conditions in said conductor means thereby unlatching said mechanism for opening said contact means; and additional means within said housing coupled to said conductor means and operative independently of said solid state trip means upon the occurrence of second predetermined overload fault current conditions for tripping said latch means to unlatch said mechanism thereby opening said contact means; said additional means being constructed to trip said latch means in the event said solid state trip means fails to trip said latch means responsive to said first predetermined current conditions.

4,090,157

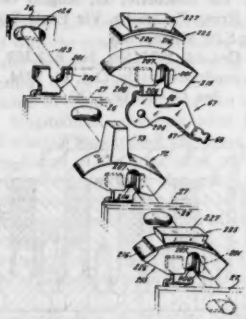
OPERATING HANDLE MEANS FOR STACKED CIRCUIT BREAKER MODULES

Tadeusz J. Rys, Bellefontaine, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.

Filed Jan. 31, 1977, Ser. No. 763,888
Int. Cl.² H01H 73/02
U.S. Cl. 335—8 **10 Claims**

1. A multipole circuit interrupter comprising a plurality of narrow single pole modules stacked side-by-side; each of said modules including cooperating contact means, a spring powered operating mechanism for opening and closing said contact means, trip means responsive to fault current conditions to trip the operating mechanism thereby opening said contact means, a relatively flat insulating housing wherein said contact means, said operating mechanism and said trip means are disposed; said housing including a front edge having an aperture; said operating mechanism including a movably mounted operating member; a first of said modules also including an insulating cap-handle means including a cap portion disposed within said housing and mounted to the operating member of the first

module and a handle extending forward from said cap portion through said aperture of the first module to be manually engaged outside of said housing; a second of said plurality of modules including a movable cap means disposed within said housing and mounted to the operating member of said second module, and a stationary cover means for the aperture of said



second module; transverse rod means positioned to the rear of said front edge extending through side aperture means in said housings, and being in operative engagement with the operating members of said first and second modules whereby the operating members thereof are connected for movement in unison.

4,090,158

CIRCUIT BREAKER

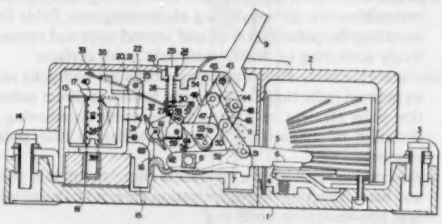
Komao Oeda, 21-17, Todoroki-7-chome, Setagaya-ku, Tokyo, Japan

Filed Dec. 3, 1976, Ser. No. 747,224

Claims priority, application Japan, Dec. 24, 1975, 50-173626[U]

Int. Cl.[2] H01H *73/12*

U.S. Cl. 335—17 **9 Claims**



1. A circuit breaker comprising:

terminal means for receiving a power source;

stationary contact means connected to said power source terminal means;

load terminal means;

a movable lever swingably supported at a portion thereof to move between a first and a second position and having movable contact means disposed on one free end of the movable lever, said movable contact means being movable between said first position at which said movable contact means is brought into contact with said stationary contact means and said second position at which said movable contact means separates from said stationary contact means;

bias means for biasing said movable lever at said second position;

means for normally urging said movable lever toward said first position against said bias means;

current sensing means for producing a first signal by detecting an overload current and a second signal by detecting a short-circuit current;

overload current responsive means actuated in response to said first signal to render inoperable said urging means to thereby displace said movable lever to said second position and automatically deactuated in response to the disappearance of said first signal;

short-circuit current responsive means for actuating said overload current responsive means in response to said second signal, said short circuit current responsive means being deactuated automatically in response to the disappearance of said second signal;

short-circuit indicating means for effecting a short-circuit indication automatically in response to the actuation of said short-circuit current responsive means, said short-circuit indicating means being resettable manually thereby removing said short-circuit indication; and

holding means for holding the actuation of said short-circuit current responsive means in response to the actuation of said short-circuit current responsive means, said holding means releasing the holding of said actuation of said short-circuit current responsive means in response to the resetting of said short-circuit indicating means.

4,090,159

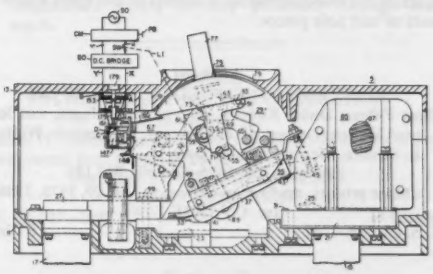
CIRCUIT BREAKER WITH IMPROVED TRIP MEANS

Walter W. Lang, and Alfred E. Maier, both of Beaver Falls, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 15, 1975, Ser. No. 605,372

Int. Cl.[2] H01H *73/02*; H02H *1/00*

U.S. Cl. 335—173 **7 Claims**



1. A circuit breaker, comprising:

(a) housing means;

(b) separable main contact means including movable arm means;

(c) tripping means disposed in said housing means for causing said movable arm means to move to an open position to cause said separable main contact means to be separated;

(d) electromagnetic coil means which is energizable to actuate said tripping means;

(e) current sensing means for sensing electric current which flows through said separable main contact means, said current sensing means providing magnetizing electrical current to a coil of said coil means when said main electric current attains a predetermined value to actuate said tripping means; and

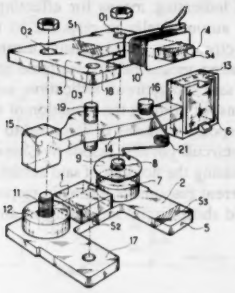
(f) manually operable electromagnetic coil energizing means connected directly to said electromagnetic coil means and bypassing said current sensing means for providing magnetizing electrical current directly to said coil means to actuate said tripping means upon command.

4,090,160

ELECTROMAGNETIC RELAY

Edouard Le Roux, Barentin, and Christian Richard, Pavilly, both of France, assignors to Societe d'Appareillage Electrique Saparel S.A., Saint-Marcellin, France

Filed Oct. 29, 1976, Ser. No. 737,133
Claims priority, application France, Nov. 13, 1975, 75 34654; Aug. 6, 1976, 76 24117; Aug. 10, 1976, 76 24357
Int. Cl.[2] H01A *9/00*
U.S. Cl. 335—179 23 Claims



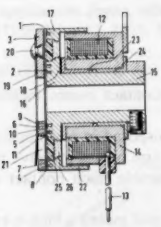
1. In a high sensitivity electromagnetic relay comprising a permanent magnet having optimized characteristics, two magnetic pole pieces, a magnetic shunt, a mobile armature cooperating with the two pole pieces and a trip winding, the improvement wherein said permanent magnet and said magnetic shunt comprise flat plates, the two pole pieces are constituted by two superposed U-shaped flat, parallel plates which sandwich between them the flat plate permanent magnet and the magnetic shunt to form a stacked flat plate assembly, and wherein the mobile armature is normal to and spans across the ends of said pole pieces.

4,090,161

ELECTROMAGNETIC CLUTCH OR BRAKE

Egon Führer; Dieter Kleinert, both of Memmingen, and Reinhard Haring, Lauben, all of Germany, assignors to Wolfgang E. Schultz, Memmingen, Germany

Filed Aug. 24, 1976, Ser. No. 717,183
Claims priority, application Germany, Aug. 29, 1975, 2538494
Int. Cl.[2] H01F *7/08*
U.S. Cl. 335—281 5 Claims



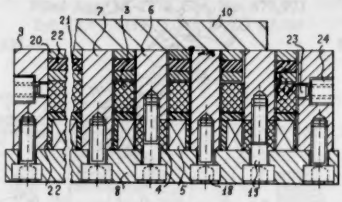
1. An electro-magnetic control structure comprising an armature having an armature face, a pole ring having an inner pole and an outer pole, said inner and outer poles having inner and outer annular pole faces respectively, each facing said armature face across an air gap, a coil associated with the pole ring for attaching said armature to said pole faces on energization of the coil by creation of a magnetic flux path extending through one of said poles to and directly through the armature and returning through the other of said poles, at least one of said pole and armature faces being split up by at least one annular groove into a plurality of concentric sections on opposite sides of said groove in each of which sections the direction of magnetic flux is the same when the coil is energized.

4,090,162

MAGNETIC ANCHORING APPARATUS

Michele Cardone, Via Boschetto, 19; Angelo Grandini, Via Bemba, 16, and Bruno Zaramella, Via Paola Sarpi, 3, all of 20090 Trezzano, S.N. Milan, Italy

Filed Oct. 14, 1975, Ser. No. 622,369
Claims priority, application Italy, Oct. 16, 1974, 28487 A/74
Int. Cl.[2] H01F *7/20*
U.S. Cl. 335—289 5 Claims



1. Magnetic apparatus for holding ferromagnetic pieces, comprising:

magnetopermanent cores defining a magnetic circuit having a work surface and including a first non-reversible magnetopermanent core of an anisotropic ceramic type material, a second reversible magnetopermanent core member of a melted type anisotropic material having a magnetic remanence greater than twice the magnetic remanence of said first core and a coercitivity less than one-third of said first core;

a magnetic yoke defining part of said work surface and coacting with said first and second magnetopermanent cores;

a polarization inverting solenoid surrounding said second reversible core for generating electromagnetic fields for inverting the polarization of said second core and respectively activating or deactivating said work surface;

said non-reversible core is interposed between said yoke and an indirect induction polar element to form a direct induction polar element, said first non-reversible core having a direction of magnetization perpendicular to said polar elements;

said second reversible core member is aligned with said yoke and has a direction of magnetization perpendicular to said first non-reversible core; and

further comprising a ferromagnetic crown common to said polar elements and opposite said work surface.

4,090,163

ELONGATED SNAP-ACTING BIMETAL ELEMENT

Harold A. McIntosh; Hollis L. Randolph, and Bradford N. Hull, all of Los Angeles, Calif., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 495,167, Aug. 6, 1974, Pat. No. 3,976,966.
This application Dec. 5, 1975, Ser. No. 638,135
Int. Cl.[2] H01H *61/00*
U.S. Cl. 337—102 3 Claims

1. An elongated snap-acting bimetal element having a single stable state at a predetermined temperature comprising

a first strip-like layer of metal having a first coefficient of thermal expansion,

a second strip-like layer of metal bonded on the first layer and having a second coefficient of thermal expansion,

said second coefficient of thermal expansion being substantially different from the first coefficient of thermal expansion,

said first and second bonded layers adapted to be secured at one end with the other end extending free,

said first and second bonded layers being bent into a transverse radius of curvature of about the predetermined temperature to retain the bonded first and second layers against longitudinal curvature until a temperature is reached whereat longitudinal curvature forces exceed the retaining forces of the transverse curvature producing snap longitudinal curvature changes,

said first and second bonded layer also being stressed toward a longitudinal radius of curvature at about the predetermined temperature,

said transverse radius of curvature being selected to oppose the force of temperature warp by increasing temperature, and

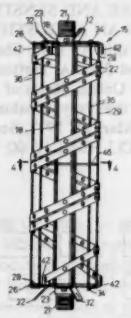
said longitudinal radius of curvature being greater than the transverse radius of curvature and being selected to add to the force of temperature warp by increasing temperature.

4,090,164

FUSE HAVING A THREADED SUPPORT STRUCTURE

Harvey W. Mikulecky, Oconomowoc, Wis., assignor to RTE Corporation, Waukesha, Wis.

Filed May 9, 1977, Ser. No. 795,201
Int. Cl.[2] H01H *85/04*
U.S. Cl. 337—159 **14 Claims**



1. A fuse comprising a hollow insulating housing,

an electrically conductive end cap on each end of said housing,

a fuse assembly supported within the housing by said end caps, said fuse assembly including a fuse element and thread means supporting said fuse element in a substantially cylindrical relation within said housing,

and arc quenching means filling said housing.

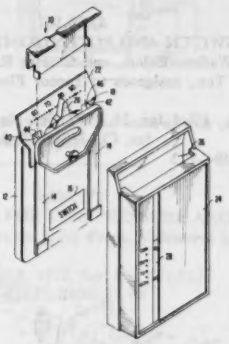
4,090,165

THERMOSTAT RANGE LIMITER

James T. Rae, 4810 Eastern Ave., Suitland, Md. 20023

Filed Sep. 29, 1976, Ser. No. 727,398
The portion of the term of this patent subsequent to Dec. 21, 1993, has been disclaimed.
Int. Cl.[2] H01H *37/12*
U.S. Cl. 337—360 **7 Claims**

1. In a thermostat having a base; a switch electrically connected to a control circuit of a heating and/or cooling system such that opening and closing of the switch controls the actuation of the heating and/or cooling system; ambient temperature responsive means attached to the base and connected to the switch such that movement of the ambient temperature responsive means caused by changes in ambient temperature opens and closes the switch; means for varying the temperature at which the ambient temperature responsive means causes the switch to open or close, said means including a manually operable temperature setting member pivotally attached to the base; and a cover removably attached to the base, the improvement comprising a range limiter comprising:



(a) a generally flat body portion having a generally rectangular shape;

(b) at least two flanges extending from one edge of said flat body portion, said flange being spaced laterally apart so as to define a notch therebetween; and

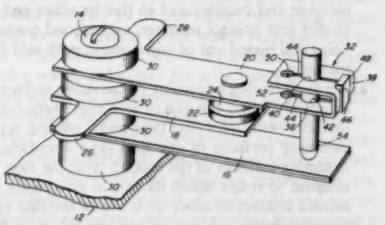
(c) means to attach said flat body portion to said thermostat such that the range limiter is within said cover and said temperature setting member protrudes through said notch.

4,090,166

SWITCH STRUCTURE AND CALIBRATION TECHNIQUE

Lyndon W. Burch, Boston, Mass., assignor to B/K Patent Development, Inc., Highland Park, Ill.

Filed Sep. 10, 1976, Ser. No. 722,106
Int. Cl.[2] H01H *37/20*
U.S. Cl. 337—360 **14 Claims**



9. In a switch including a movable contact-making and contact-breaking member that moves with respect to a fixed contact in response to a first environmental parameter, the improvement comprising an assembly for providing an abutment member for said movable member, said assembly comprising

an abutment member disposed to engage said movable contact-making and contact-breaking member,

a bracket for said abutment member having an opening in which said abutment member is received, said opening having an unstressed size and shape that causes said

bracket to grip an abutment member received in said opening, and

stressing means that stress said opening to a size and shape permitting movement of said abutment member with respect to said bracket and that are deformable at a particular value of an environmental parameter;

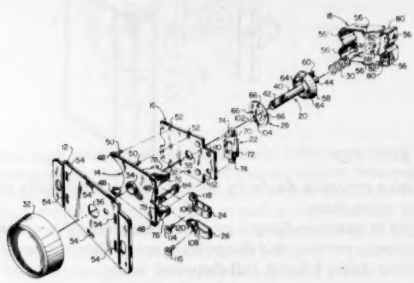
thereby enabling said abutment member to be moved to a predetermined location and then gripped by said bracket upon exposure of said stressing means to said particular value of said environmental factor.

4,090,167

PUSH SWITCH AND POTENTIOMETER ASSEMBLY

Jerry L. Walker, Euless, and Charles R. Crockett, Arlington, both of Tex., assignors to Teccor Electronics, Inc., Euless, Tex.

Filed Jan. 31, 1977, Ser. No. 763,830
Int. Cl.² H01C *10/36*
U.S. Cl. 338—172 **6 Claims**



1. A potentiometer and switch assembly comprising:

a base member having a resistive element deposited thereon;

a control member including a shaft porton;

means mounting said control member so that the axis of said shaft portion is normal to said base member for axial reciprocating movement and for rotational movement about said axis;

a wiper element;

means mounting said wiper element on said control member;

resilient means urging said control member in a first axial direction to urge said wiper element into engagement with said resistive element;

a switch including a first contact member fixedly mounted on said base member and a second contact member including an elongated spring mounted at one end on said base member and cantilevered so that its other end is adjacent to said first contact member, said second contact member being self biased out of engagement with said first contact member;

a cam shaft having a plurality of camming surfaces angularly disposed around the axis of said cam shaft, said camming surfaces being of a first type and a second type with the camming surfaces of the first type alternating with the camming surfaces of the second type, the cam shaft being adapted to rotate about its axis to alternately engage the second contact member with one of the first type of camming surfaces and one of the second type of camming surfaces, the camming surfaces of the first type urging said second contact into engagement with said first contact member and the camming surfaces of the second type allowing said second contact member to be self biased out of engagement with said first contact member;

means mounting said cam shaft for rotation about its axis and laterally displaced from said control member; and

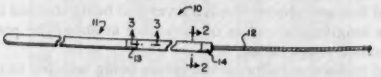
cam shaft engagement means mounted on said control member for rotating said cam shaft through a predetermined angle whenever said control member is moved in a second axial direction against the urging of said resilient means so that the camming surfaces of the first and second type alternately engage the second contact member each time the control member is reciprocated.

4,090,168

SOLID FILLED VIBRATION ISOLATION MODULE FOR A TOWED SONAR ARRAY

Howard A. Miller, Encinitas; Robert R. Smith, and Charles S. Nichols, both of San Diego, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 17, 1977, Ser. No. 797,882
Int. Cl.² B63B *21/00*
U.S. Cl. 340—3 T **11 Claims**



1. An apparatus for isolating a towed sonar array from the noise created by a towing cable comprising:

means connected to the array and the cable for resiliently bearing the drag imposed by the towed array;

means connected to the array and the cable for rigidly bearing the drag imposed by the towed array when the drag increases beyond a given magnitude; and

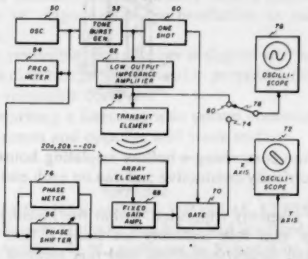
means disposed about the resiliently bearing means and the rigidly bearing means for damping the noise and for resiliently encasing them.

4,090,169

METHOD AND APPARATUS FOR DETERMINING RELATIVE PHASE AND SENSITIVITY OF ELEMENTS IN AN ACOUSTIC ARRAY

Lyles C. Adair; Willis A. Teel; Christian P. F. Werle, all of Panama City, and John A. Hutton, Lynn Haven, all of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 25, 1977, Ser. No. 781,088
Int. Cl.² H04B *11/00*; H04R *29/00*
U.S. Cl. 340—5 C **13 Claims**



1. Apparatus for determining relative operational characteristics of individual electroacoustic transducer array elements of an array including holder means and a plurality of array elements disposed in side-by-side relation with their faces lying in a common plane, said apparatus comprising:

spacer means, mounted on said holder means, for providing a guide surface in parallel spaced relation to said common plane;

a transmit element disposed for movement along said guide surface into positions in opposition to each of said array elements at a predetermined distance *d* therefrom;

an acoustically transmitting medium between said transmitter element and said array elements;

input signal generating means, connected to said transmit element, for causing said transmit element to project

acoustic energy signals of predetermined frequency through said medium to each of said array elements when said transmit element is positioned in opposition thereto;

variable phase shifter means, connected to said input signal generating means, for providing a selectively variable phase signal of said predetermined frequency;

phase comparison means, coupled to said array element and to said phase shifter means, for indicating an in-phase relationship between said output signal and said phase shifted signal; and

phase meter means for measuring the amount of phase shift required by said phase shifter means to achieve said in-phase relationship.

4,090,170

PROCESS AND APPARATUS FOR INVESTIGATING THE ACTIVITY OF A CATHODIC PROTECTION UNIT

Jan Lincklaen-Arriens, The Hague; Alfred van Tilburg, and Teunis L. van Waart, both of Amsterdam, all of Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Nov. 11, 1976, Ser. No. 740,904

Claims priority, application Netherlands, Dec. 17, 1975, 7514693

Int. Cl.[2] H04B *11/00*

U.S. Cl. 340—5 R **15 Claims**

1. A method for measuring the cathodic protection potential of a structure at a remote location and transmitting the measurement to a convenient location, said method comprising:

measuring the cathodic protection potential between the structure and a reference electrode at the remote point;

converting the measured cathodic protection potential to a related frequency;

producing an acoustic signal having said related frequency; and

transmitting said acoustic signal to said convenient location.

4,090,171

UNDERWATER ACOUSTIC PRESSURE RELEASE REFLECTOR

Robert J. Bulmer, Gales Ferry, and Edwin J. Parssinen, Mystic, both of Conn., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 18, 1963, Ser. No. 259,797

Int. Cl.[2] H01Q *15/14*

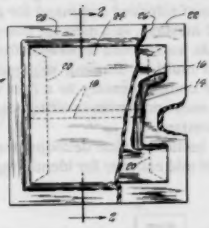
U.S. Cl. 340—8 FT **4 Claims**

1. An underwater acoustic reflector for use at elevated hydrostatic comprising:

(A) a plurality of thin paper laminae assembled in an integrated stack wherein all the paper laminae run in essentially the same direction,

(B) a thin-walled gas confining wrapping intimately surrounding and enclosing said stack of paper, and

(C) a waterproof jacket enclosing said wrapped stack of paper and being of a material having characteristic acoustic impedance approximately the same as that of seawater enclosing said wrapped paper.



4,090,172

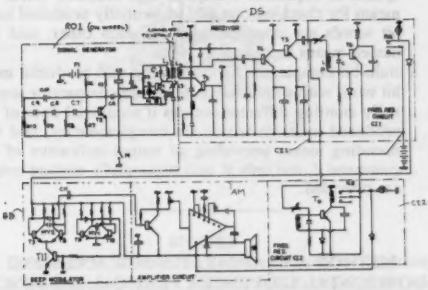
WARNING DEVICE FOR TIRE PRESSURE ANOMALIES

Borislav Vesnic, 50 rue du grain d'anis, Villeneuve sur Yonne, France (89500)

Filed Aug. 4, 1975, Ser. No. 601,523

Int. Cl.[2] B60C *23/04*

U.S. Cl. 340—58 **12 Claims**



1. A device for providing a warning signal when the inflation pressure of a respective vehicle tire mounted on a metallic frame falls out of a predetermined range, comprising a plurality of signalling circuits each adapted to be mounted to a respective wheel to which an inflated tire is mounted, each signalling circuit including a tire pressure sensor adapted to be mounted to the wheel and generate an output signal, oscillating circuit means adapted to be mounted to the wheel responsive to the output signal of said sensor for producing an oscillating signal in the form of a wave, and means for inductively transmitting said oscillating signal via the respective wheel to said metallic frame, the oscillating signal produced by each oscillating circuit means being at a different predetermined frequency; pick-up means including a plurality of tuned receiver means adapted to be mounted on the frame for detecting respectively the oscillating signals produced by each of said oscillating circuit means and generate an output signal responsive thereto; and a plurality of indicator means adapted to be mounted in the vehicle responsive to the output signal of said pick-up means for indicating tire pressure conditions in the respective tires.

4,090,173

VITAL DIGITAL COMMUNICATION SYSTEM

Henry C. Sibley, Adams Basin, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed Dec. 17, 1976, Ser. No. 751,505

Int. Cl.[2] G06F *11/08*

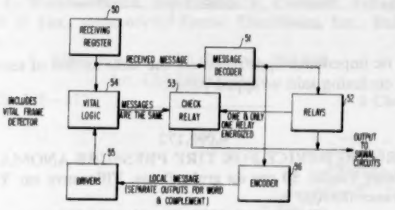
U.S. Cl. 340—146.1 BA **18 Claims**

1. Vital digital communication system responsive to the

selection of a desired command to be sent for encoding a corresponding message, transmitting and decoding the message to derive said command in a vital manner comprising:

a transmitter including encoding means responsive to the selection of a desired command for generating and outputting said message, said message comprising a pair of multi-bit words, each word separated from other words by an identical multi-bit framing sequence, a second word of said pair complementary to a first word of said pair, the ratio of ones and zeroes in either said first or second word being constant,

a receiver including vital decoding means responsive to the output of said encoder for identifying said framing bits and



for identifying each word of said message, said vital decoding means including,

means for sequentially producing multi-bit words in response to sequential receipt of said encoded words and means for checking that said sequentially produced multi-bit words are complementary to each other, said last-named means including,

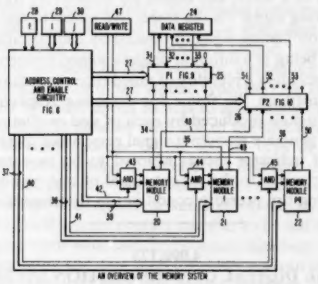
a multi-bit comparator for comparing said produced multi-bit word with a multi-bit pattern, said comparator sequentially emitting different outputs if sequential ones of said produced multi-bit words are complementary, said vital decoding means providing an output indicative of said command if, and only if, said sequentially emitted outputs are provided.

4,090,174

METHOD AND APPARATUS FOR ACCESSING HORIZONTAL SEQUENCES, VERTICAL SEQUENCES AND RECTANGULAR SUBARRAYS FROM AN ARRAY STORED IN A MODIFIED WORD ORGANIZED RANDOM ACCESS MEMORY SYSTEM

David Curtis Van Voorhis, Los Gatos, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 1, 1976, Ser. No. 737,501
Int. Cl.[2] G06K *9/00*; G06F *15/20*
U.S. Cl. 340—146.3 MA **8 Claims**



1. A word organized random access memory system modified for image processing operations so that the memory system can store an image array comprising a predetermined number *rpsq* of image points arranged in a predetermined number *rp* of rows with a predetermined number *sq* of image points in each row, and modified so that every $1 \times pq$ subarray, every $pq \times 1$ subarray and every $p \times q$ subarray of the $rp \times sq$ image array can be accessed in a single memory cycle, the system comprising:

memory means for storing *rpsq* image points in the cells of $pq+1$ different memory modules, each memory module being an entity capable of storing *rs* image points in distinguishable cells, only one cell of each module being accessible at any single instant of time;

means for selectively designating, from all $1 \times pq$ subarrays, all $pq \times 1$ subarrays and all $p \times q$ subarrays stored in said memory means, which subarray is to be accessed; and

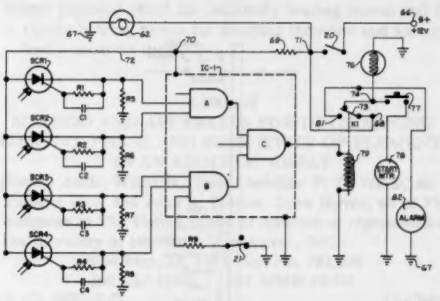
accessing means responsive to said designating means for causing each image point in the designated subarray to be selectively read from or written into a predetermined cell of a predetermined memory module so that the entire designated subarray is accessed in a single memory cycle.

4,090,175

OPTO-ELECTRONIC LOCK DEVICE

Robert Lee Hart, 1525 Olive St., Indianapolis, Ind. 46203

Continuation-in-part of Ser. No. 681,555, Apr. 29, 1976, abandoned. This application Feb. 4, 1977, Ser. No. 765,854
Int. Cl.[2] H04Q *3/00*
U.S. Cl. 340—164 R **10 Claims**



1. A lock comprising:

a lock housing having a key opening in it;

a key cylinder received in said housing and rotatable on its cylindrical axis in said housing from a lock position to an unlock position, said cylinder having an axially-extending keyway therein facing said opening and extending from an outer end of said cylinder toward an inner end of said cylinder;

a support secured to said housing in alignment with the inner end of said cylinder;

a plurality of cylinder lock pins in said support and movable therein parallel to said axis;

pin-loading means in said support and urging said pins axially into pin-receiving apertures in said cylinder;

a plurality of lock pin locators in said apertures and seated in said cylinder and having front ends exposed in said keyway and rear ends supporting said lock pins against said urging, said locators being of varied overall lengths from their front ends to rear ends whereby said lock pins extend partially in said support and partially in said cylinder and lock said cylinder from rotating, and said locators being axially movable by a key having an end contour matched to said varied lengths such that when said key is applied to said locators in said keyway, it will push said lock pins out of said key cylinder and place the rear ends of said locators substantially flush with the rear end of said cylinder to unlock said cylinder for rotation by said key to said unlock position.

a first switch located on said support and having an operator member;

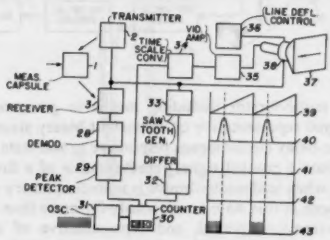
a switch actuator pin extending in said support in alignment with one of said lock pins and aligned with said operator member, said actuator pin being linearly movable into switch-operating engagement with said switch operator member by the lock pin aligned with said actuator pin when the said one lock pin has been pushed out of said key cylinder.

4,090,176

TELEMETRIC MEASURING APPARATUS FOR BIOLOGICAL OBJECTS

Hans Rodler, Pehamweg 3-5, Graz-Neuhart, Austria

Filed Feb. 20, 1976, Ser. No. 659,780
Claims priority, application Austria, Feb. 21, 1975, 1354/75
Int. Cl.[2] G08C *19/12*
U.S. Cl. 340—189 M **14 Claims**



1. Apparatus for measuring the value of a predetermined parameter in a biological object, comprising, in combination, transmitter means located outside of said object for transmitting a transmitter signal having a first frequency toward said biologicl object; first resonant circuit means located inside said object and having a resonant frequency varying from a first frequency as a function of said value of said parameter, for receiving said transmitter signal and modulating the same in correspondence to said value of said parameter, thereby furnishing a modulated transmitter signal; second resonant circuit means connected to said first resonant circuit means and tuned to a second frequency different from said first frequency, for transmitting a resonant output signal in response to said modulated transmitter signal, the so-transmitted resonant output signal constituting a return signal; signal receiver means located outside said object for receiving said resonant output signal and furnishing an indication thereof; and output means connected to said transmitter means for changing the frequency of said transmitter signal until said resonant output signal has a maximum value indicative of correspondence between said transmitter signal frequency and said resonant frequency, the so-determined transmitter signal frequency constituting a measure of said value of said parameter.

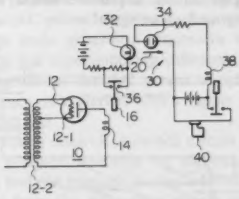
4,090,177

EARLY FIRE COMPOUND SENSING SYSTEM AND APPARATUS

Kenrokuro Urata, and Yoshiyuki Sasai, both of Tokyo, Japan, assignors to Yuwa Industrial Co., Ltd., Tokyo, Japan

Filed Dec. 10, 1976, Ser. No. 749,713
Claims priority, application Japan, Dec. 15, 1975, 50-149314
Int. Cl.[2] G08B *17/00*
U.S. Cl. 340—227 R **3 Claims**

1. A fire sensing system comprising at least one first sensor providing an output responsive to an early fire stage at least one second sensor providing an alarm output responsive to a later fire stage, each such second sensor having a variable sensitivity and a coupling means therebetween enabling the output of any of said first sensors to raise the sensitivities of



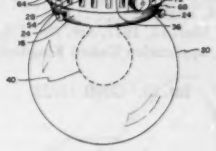
said second sensor, characterised by elevation of the overall sensitivity of said system with minimum errors.

4,090,178

COMBINATION SMOKE DETECTOR AND LAMP STRUCTURE

Elwood G. Norris, 1520 Canterbury Dr., Salt Lake City, Utah 84108

Filed Aug. 9, 1976, Ser. No. 712,954
Int. Cl.[2] G08B *17/10*
U.S. Cl. 340—237 S **9 Claims**



1. Combination fire detector and lamp structure comprising
a housing formed with a bottom wall and side walls, and open at the top thereof, said bottom wall having an opening centrally located therein, said housing including means for mounting the housing on a standard electrical outlet box,
a lamp socket disposed centrally in the housing so that the socket opening may receive the base of a lamp bulb through the opening in said bottom wall, and
fire detector circuitry disposed in the housing about said lamp socket, said circuitry including an audible sound producing device and a detector element responsive to the occurrence of fire at or near the detector for causing the sound producing device to produce audible sound.

4,090,179

SYSTEM FOR MONITORING FLOW RATE DIFFERENCE IN WATER COOLING CONDUIT

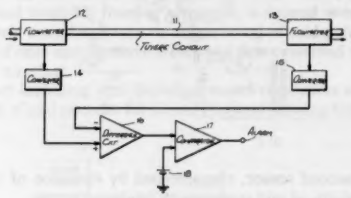
Toru Hirano, Yokohama, Japan, assignor to Hokushin Electric Works, Ltd., Tokyo, Japan

Filed Jan. 21, 1977, Ser. No. 761,241
Claims priority, application Japan, Jan. 29, 1976, 51-8914
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—242 **5 Claims**

1. A system for monitoring the difference between the flow rate at the inlet and the flow rate at the outlet of a flow conduit to determine whether a disparity exists therebetween that is indicative of a leak in the conduit, said system comprising: p1 A. inlet and outlet vortex-shedding flowmeters in said conduit, each having a sensor probe to generate a pulse output signal whose frequency is a function of the rate of flow, said probes

being subject to contamination giving rise to a spurious output signal;

B. means including a pulse counter coupled to each flowmeter periodically to integrate the pulse output signals thereof developed during a predetermined interval to produce an integrated-value signal;



C. means to determine the difference between the integrated-value signals of the inlet and outlet flowmeters to produce an integrated-value difference signal reflecting the existence of a disparity in the inlet and outlet flow rates, and

D. means to compare the integrated-value difference signal with a set value to produce an alarm signal when the difference signal exceeds said set value.

4,090,180

VIBRATION-RESPONSIVE INTRUDER ALARM SYSTEM

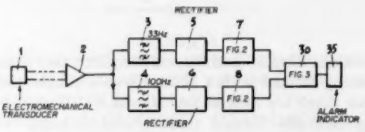
Peter Jack Barowitz, Welwyn, and Roy Baxendale, Harpenden, both of England, assignors to Elliott Brothers (London) Limited, Chelmsford, England

Filed Mar. 11, 1977, Ser. No. 776,439

Claims priority, application United Kingdom, Mar. 16, 1976, 10494/76

Int. Cl.[2] G08B *13/22*

U.S. Cl. 340—261 **4 Claims**



1. An intruder alarm system comprising at least one electromechanical transducer providing electric signals in response to vibrations incident on said transducer, said electric signals extending over a range of frequencies, filter means to select electric signal components in a band of frequenies within said range, means to rectify said selected signal components to provide a first electric waveform, means to derive a second electric waveform which tends to follow said first waveform but with slowed rise times, and detector means to give an output signal if said first waveform exceeds said second waveform in magnitude for longer than a predetermined period.

4,090,181

SHAFT ROTATION MONITORING SYSTEM

Mohammad Tariq Ansari, Houston, and Richard Lee Gobert, Pasadena, both of Tex., assignors to Allied Industries, Inc., Houston, Tex.

Filed Dec. 20, 1976, Ser. No. 752,276

Int. Cl.[2] G01P *3/56*; G08B *21/00*

U.S. Cl. 340—271 **17 Claims**

1. A system for monitoring the rotational velocity of a shaft comprising:

A. a shaft pulse generating means for providing a series of pulses having an instantaneous repetition rate proportional to the rotational velocity of said shaft,

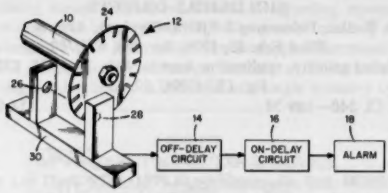
B. an off-delay circuit means including a retriggerable monostable multivibrator, said multivibrator being responsive to each pulse of said series to:

switch to a first binary state if in a second binary state at the time of said pulse, or

remain in said first state if in said first binary state at the time of said pulse, and

being further responsive to the most recent pulse in said series to:

switch from said first binary state to a second binary state after a first predetermined period has elapsed following said most recent pulse, and



said multivibrator including means to generate a state signal representative of its current binary state,

C. an on-delay circuit means responsive to said state signal to generate a control signal representative of a first binary state when said multivibrator is in its first binary state and has been in that state continuously for more than a second predetermined period, and representative of a second binary state when said multivibrator is in its first binary state and has been in that state continuously for less than said second predetermined period, or when said multivibrator is in its second binary state.

4,090,182

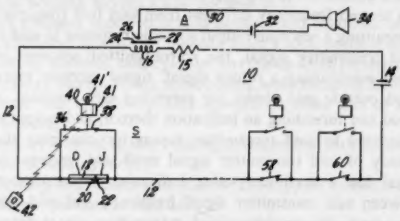
SECURITY SYSTEM EMPLOYING RADIO TRANSMITTER AND RECEIVER

Robert Bruno Young, 3 Dorset Way, Glen Cove, N.Y. 11542

Filed Mar. 22, 1976, Ser. No. 669,277

Int. Cl.[2] G08B *13/08*

U.S. Cl. 340—274 R **7 Claims**



1. A security system for giving an alarm upon each occurrence when unauthorized persons gain access to a protected space by opening openable means such as a door or window and for permitting access to said protected space by authorized persons without revealing the presence of the security system, comprising:

circuit means operatively associated with said openable means,

voltage means for applying a voltage to said circuit means,

alarm means operatively associated with said circuit means for giving an alarm in response to a given condition of said circuit means,

first switch means in said circuit means the condition of which changes when said openable means is opened,

portable transmitter means concealable on the person of an

authorized user of the system and controllable by such user for transmitting a control signal,

receiver-driver means for receiving said control signal, and

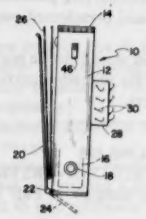
two-position switch means in said circuit means movable back and forth between said two positions by said receiver-driver means in response to reception or nonreception of said control signal so long as said receiver-driver means is operative, the position of said two-position switch means when said openable means is open then determining the condition of said circuit means and hence whether said alarm means is actuated.

4,090,183

BILLFOLD ANTI-THEFT DEVICE

Joe Miller, East Orange, N.J., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed May 5, 1977, Ser. No. 793,837
Int. Cl.² G08B *13/14*
U.S. Cl. 340—280 **5 Claims**



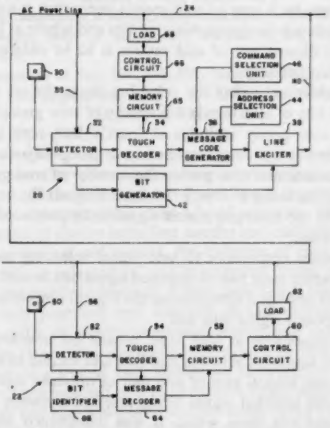
1. A billfold anti-theft device comprising a housing, an alarm positioned within the housing, means for releasably securing a billfold to the outside of the housing and means releasably attached to said housing adapted to activate said alarm when removed from said housing.

4,090,184

TOUCH CONTROLLED SWITCH SYSTEM OPERABLE BY TOUCH INPUTS AND CODED MESSAGE SIGNALS TRANSMITTED OVER POWER LINE

William F. Hamilton, II, 1512 Miramar Beach, Santa Barbara, Calif. 93108

Filed Jul. 15, 1976, Ser. No. 705,712
Int. Cl.² H04M *11/04*
U.S. Cl. 340—310 A **15 Claims**



1. A touch controlled switch system operable by local touch inputs and binary coded message signals generated by remote touch inputs and transmitted over an AC power line for operating a load device, comprising:

a first touch controlled switch circuit including a first touch receptor operable by electrical contact with a human body in response to an induced hum pickup signal derived from an AC power supply signal on the power line and a message code generator responsive to said first touch receptor for superimposing different binary coded message signals on the AC power supply signal upon the occurrence of different touch inputs at said first touch receptor; and

a second touch controlled switch circuit including a second touch receptor operable by electrical contact with a human body in response to the induced hum pickup signal derived from the AC power supply signal and a control circuit responsive to said second touch receptor for operating a load device coupled to said control circuit upon the occurrence of different touch inputs at said second touch receptor,

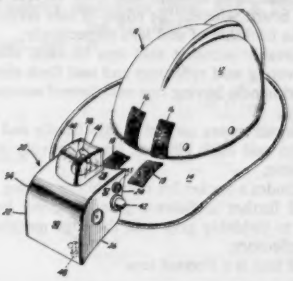
said second touch controlled switch circuit including a message detector coupled to the power line for detecting the binary coded message signals superimposed on the AC power supply signal and a message decoder responsive to said message detector for selectively actuating said control circuit to operate said load device in response to the different binary coded message signals produced by different touch inputs at said first touch receptor.

4,090,185

EMERGENCY POSITION-FIXING DEVICE

Richard L. Patty, Box 56, New Haven, Ind. 46774

Filed Nov. 10, 1975, Ser. No. 630,312
Int. Cl.² G08B *23/00*
U.S. Cl. 340—321 **10 Claims**



1. Position fixing apparatus comprising:

a housing;

first signal generating means for generating a human discernible signal; said means being self-contained in said housing;

attaching means affixed to said housing for removeable attachment of said housing to an attaching surface; and

first switch means in said housing for automatically disabling said signal responsive to the attaching of said housing to the attaching surface and for automatically continually enabling said signal of said housing from the attaching surface.

4,090,186

SIGNALING DEVICE

Harold J. Renner, 8141 Utah St., Buena Park, Calif. 90621

Filed Dec. 8, 1976, Ser. No. 748,524
Int. Cl.² G08B *23/00*
U.S. Cl. 340—321 **1 Claim**

1. A hand held signaling device comprising:

a sign board having broad flat display surfaces constituting the obverse and reverse sides thereof and having a cen-

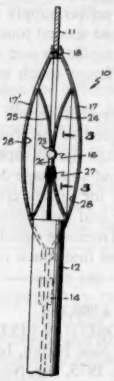
trally located opening surrounded by said obverse and said reverse sides;

a pair of parabolic coaxial reflectors arranged back-to-back with respect to each other so as to totally occupy said board central opening and having concentric openings provided in the apex thereof and coaxially disposed with respect to said board central opening;

a flash element mounted in said concentric parabolic reflector openings substantially occupying the open area thereof;

a clip removably retaining said flash element to both of said reflectors at the edge marginal region of said concentric openings;

a pair of concave lenses carried on opposite sides of board



retaining said flash element and both of said reflectors onto said board wherein the edges of said reflectors bear against the backside of said lens respectively;

means removably securing said lens to each side of said board covering said reflectors and said flash element;

an elongated handle having one end thereof secured to said sign board;

electrical circuit means carried in said handle and operably coupled to said flash element for selectively energizing said element;

said clip includes a docket for releasably mounting said flash tube, and further includes a pair of spring legs biased together to yieldably grip with the edge marginal region of said reflectors;

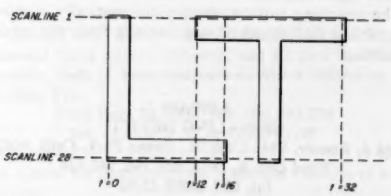
each of said lens is a Fresnel lens.

4,090,187

TELEVISION TITLING SYSTEM FOR PRODUCING OVERLAPPING CHARACTERS

Stephen Kreinik, Monsey, N.Y., assignor to Thomson-CSF Laboratories, Inc., Stamford, Conn.

Filed May 10, 1976, Ser. No. 684,558
Int. Cl.² G06K *15/20*
U.S. Cl. 340—324 AD **9 Claims**



1. In an apparatus for receiving a sequence of character-representative signals and for generating video control signals which are suitable for controlling a scanned display to present the sequence of characters on the display, said apparatus including timing generator means for generating timing signals which are synchronized with the display scan; character storage means for storing the character-representative signals and periodically reading out character-representative signals which correspond to a character in the sequence; and stroke generator means responsive to the timing signals and the character-representative signals for producing a stroke of a character to be displayed; a subsystem for presenting predetermined adjacent characters among said sequence in overlapping positions on the display, comprising:

means for sensing the successive occurrence of at least one preselected pair of character-representative signals and for thereupon generating an occurrence indication;

means responsive to said occurrence indication for accelerating the readout of the stroke of the second-occurring of said preselected pair of characters;

means for storing the last-occurring portion of the stroke of the first-occurring of said preselected pair of characters; and

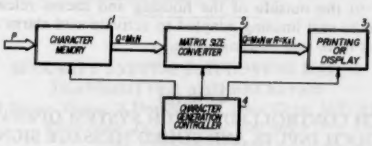
means for reading out said stored stroke portion in conjunction with the stroke of the second-occurring of said preselected pair of characters.

4,090,188

DOT MATRIX CONVERTER

Gojiro Suga, Ebina, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Jul. 6, 1976, Ser. No. 702,472
Claims priority, application Japan, Jul. 7, 1975, 50-83292
Int. Cl.² G06F *3/14*
U.S. Cl. 340—324 AD **3 Claims**



1. In a dot matrix display system including character printers having means for displaying characters represented as an array of bits, using a source of bit signals in a matrix array whose elements correspond to the dots of the intended character, a dot matrix size converter for enlarging an original $m \times n$ matrix where each row of said matrix comprises n signal bits and each column comprises m signal bits and where at least one of the two dimensions of said matrix is to be enlarged, said converter comprising:

signal selecting means for selecting from the m rows of signal bits of said matrix a plurality of row groups where each row group includes at least a first row which is adjacent to a second row in a row group adjacent to the aforementioned row group, the number of row groups of signal bits being $k - m + 1$ where k equals the number of rows in the enlarged matrix signal to be produced by said converter;

logic means responsive to said signal selecting means for comparing each pair of opposed signal bits in said first and second rows and determining the logical sums of said pairs of opposed signal bits; and

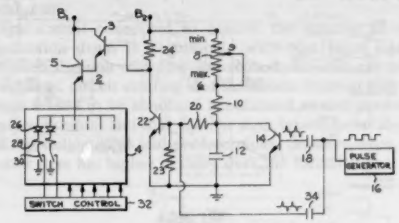
means responsive to said logic means for inserting a "1" output signal bit between said first and second rows whenever said logical sum of said pair of opposed signal bits is "1", the inserted signal being inserted between the said opposed bits from which it was determined and a "0" output bit being inserted whenever said logical sum is "0", whereby said enlarged matrix signal is produced for displaying.

4,090,189

BRIGHTNESS CONTROL CIRCUIT FOR LED DISPLAYS

Charles F. Fisler, New Hartford, N.Y., assignor to General Electric Company, Syracuse, N.Y.

Filed May 20, 1976, Ser. No. 688,474
Int. Cl.[2] G09B 13/00; H05B 39/00, 41/00
U.S. Cl. 340—335 7 Claims



1. A brightness control circuit for controlling the current flow from a source of energizing potential to an electronic display for thereby controlling the light output brightness of said display, comprising:

a. a charge-discharge capacitor coupled to a point of fixed reference voltage,

b. charge circuit means for developing a voltage across said capacitor that will exceed a given threshold voltage Vth with respect to said reference voltage,

c. discharge circuit means for periodically reducing the capacitor voltage toward said reference voltage,

d. said charge circuit means including an adjustable element that adjusts the initial rate of change of said capacitor voltage in accordance with a selected display brightness so that the time required for the voltage to exceed Vth is likewise in accordance with said display brightness,

e. threshold voltage sensing means for deriving a drive signal having a duty cycle that is a function of the relative time said capacitor voltage is above and below Vth,

f. switching means for coupling said source of energizing potential to said display, and

g. means for applying said drive signal to said switching means so as to control its operation as a function of said duty cycle.

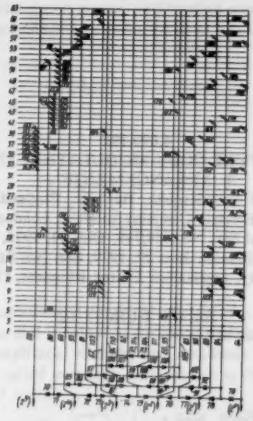
4,090,190

READ ONLY MEMORY

Vladimir Stepanovich Rostkovsky, and Ljubov Dmitrievna Rostkovskaya, both of ulitsa, 10, korpus 4, kv. 34, Moscow, U.S.S.R.

Continuation of Ser. No. 145,305, May 20, 1971, abandoned.
This application Aug. 6, 1973, Ser. No. 386,095
Int. Cl.[2] H03K 13/252
U.S. Cl. 340—347 DD 9 Claims

1. A read-only memory comprising a sequence of storage-in buses; a plurality of storage-out buses representing respectively 2^0, 2^1 . . . 2^n, said storage-out buses being respectively connected to corresponding ones of said sequence of storage-in buses, pairs of diodes including anodes and cathodes and junctions connecting said anodes, the cathodes of each pair being connected to selected of said storage-out buses of adjacent order, intermediate buses of a first rank being connected between said junctions and selected of said storage-in buses, further pairs of diodes including anodes and cathodes and junctions connecting the latter said anodes, further intermediate buses of a second rank connected between the latter said junctions and selected of said storage-in buses, additional pairs of diodes and additional intermediate buses being connected in pyramidal relationship of further sequential ranks until only one said additional intermediate bus is connected as a final rank to one of said storage-in buses, and further diodes interconnecting selected of said storage-in buses with said storage-out buses such that said storage-out buses operating in conjunction with said intermediate buses are adapted to express a sequence of



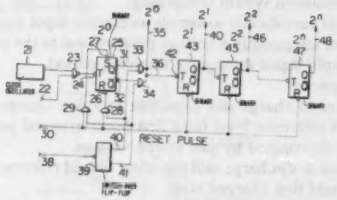
digital numbers with a minimal number of diodes and thereby with increased reliability.

4,090,191

COUNTING CIRCUIT SYSTEM FOR TIME-TO-DIGITAL CONVERTER

Setsuro Kinbara, Mito, Japan, assignor to Japan Atomic Energy Research Institute, Tokyo, Japan

Filed Aug. 5, 1976, Ser. No. 711,979
Claims priority, application Japan, Aug. 8, 1975, 50-96474
Int. Cl.[2] H03K 13/02
U.S. Cl. 340—347 AD 3 Claims



1. In a time to digital converting circuit providing digital information by gating clock pulses of constant cycle by time signals with information in its pulse width and by counting the gated clock pulses by a scaler; a combination of; two AND gates respectively provided in a reset circuit and an output circuit of a first stage binary of said scaler, the output of the first AND gate of said reset circuit being connected to the reset terminal of said first stage binary, the output of the second AND gate of said reset circuit being connected to the set terminal of said first stage binary, the input to the first AND gate of said output circuit being connected to the true value output terminal of said first stage binary, the input to the second AND gate of said output circuit being connected to the complementary value output terminal of said first stage binary, the outputs of the two AND gates in said output circuit being combined with OR function to be a carry signal to succeeding binary and an output signal to outside; a first switch over signal circuit provided to be connected to the first AND gate of said reset circuit and to the first AND gate of said output circuit; and a second switch over signal circuit provided to be connected to the second AND gate of said reset circuit and to the second AND gate of said output circuit, the switch over signals of said two switch over signal circuits being related to act

as a true and a complementary at the output of a switch over flip-flop.

4,090,192

ELECTRIC PUKE CODE MODULATION ENCODING ARRANGEMENTS

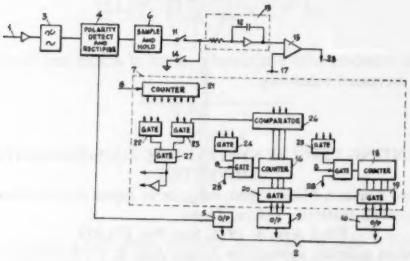
Anthony Ernest Shuttleworth, Burbage, England, assignor to The General Electric Company Limited, London, England

Continuation of Ser. No. 624,749, Oct. 23, 1975, abandoned. This application Jun. 29, 1977, Ser. No. 810,998

Claims priority, application United Kingdom, Oct. 29, 1974, 46751/74

Int. Cl.[2] H03K *13/02*

U.S. Cl. 340—347 NT **8 Claims**



1. An electric encoding arrangement for a pulse code modulation transmission system comprising:

(A) means periodically to sample an electric input signal and to store temporarily a voltage proportional to the value of that input signal during the sampling period,

(B) a capacitor,

(C) means to charge said capacitor to a first charged state from a reference level for a first predetermined period at a rate determined by said stored voltage,

(D) means to discharge said capacitor to said reference level from said first charged state,

(E) means responsive to the capacitor discharge time from said first charged state and, hence, the value of charge on the capacitor in its first charged state to derive a first digitally coded signal denoting in which of a plurality of contiguous ranges of voltages the stored voltage in the first charged state lies,

(F) means to charge the capacitor to a second charged state from a reference level at a rate determined by said stored voltage, the second charging being for a second period selected from a plurality of predetermined periods in dependence upon the segment in which said first stored voltage lies,

(G) means to discharge said capacitor from said second charged state to said reference level after said second predetermined period,

(H) means responsive to the capacitor discharge time from said second charged state and, hence, to the value of the charge on the capacitor in its second charged state derive a second digitally coded signal which represents the value of charge acquired by said capacitor at the end of said second predetermined period,

(I) the complete coded signal representing the value of said stored sample voltage comprising at least parts of said first and second digitally coded signals.

4,090,193

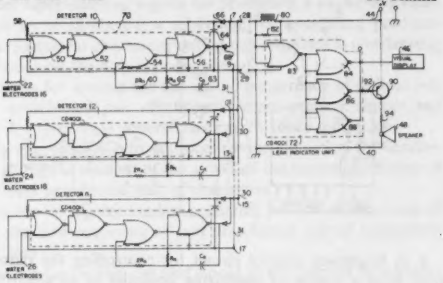
FREQUENCY MULTIPLEXED WATER LEAK DETECTION SYSTEM

Francis E. Hinkle, Jr., Austin, Tex., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 24, 1976, Ser. No. 744,560

Int. Cl.[2] G08B *19/00*

U.S. Cl. 340—412 **10 Claims**



1. A system for detecting and locating a fluid leak comprising:

a plurality of sensing means for detecting a fluid, each situated in a different location;

circuitry coupled to respective sensing means for providing an electrical signal indicative of a fluid sensed by the sensing means coupled thereto, said signal having a unique frequency different from any other sensing circuitry in the system; and

an indicator unit electrically coupled in parallel to all of said sensing means through their respective circuitry for providing an indication and location of said fluid leak.

4,090,194

INDICATION APPARATUS

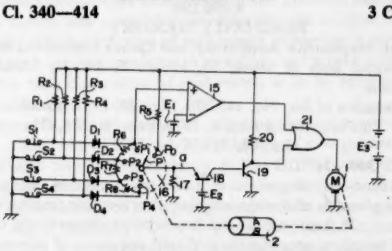
Shuichi Kosuge, Nagoya, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed Feb. 25, 1977, Ser. No. 772,278

Claims priority, application Japan, Mar. 10, 1976, 51-26265; Mar. 12, 1976, 51-27394

Int. Cl.[2] G08B *19/00*

U.S. Cl. 340—414 **3 Claims**



1. An indication apparatus comprising:

an indication drum having a plurality of indicia thereon;

a plurality of stationary contacts positioned circularly to correspond to respective indicia on said indication drum;

a first movable contact coupled to be rotated in synchronized relationship with said indication drum for contacting one of said stationary contacts when one of said indicia is positioned at a predetermined position due to rotation of said indication drum;

a second movable contact coupled to be rotated in synchronized relationship with said indication drum for contacting another of said stationary contacts when said first

movable contact contacts with said one of said stationary contacts;

a plurality of sensors connected to said respective stationary contacts for sensing the abnormal state of respective items corresponding to said indicia and applying an output signal to the corresponding stationary contact;

priority means for applying said output signal to the stationary contact corresponding to the item having either higher or lower priority over the item sensed to be abnormal; and

a logic circuit connected to control the rotation of said indication drum in accordance with two input signals applied through said first and second movable contacts, said logic circuit rotating said indication drum so that the item sensed to be abnormal is indicated at said predetermined position and that another item sensed to be abnormal is indicated at said predetermined position when the latter item has higher priority over the former item.

4,090,195

ANTI-BURGLAR MINI-RADAR

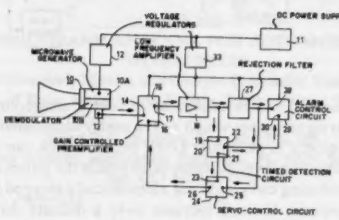
Serge Guennou, Croissy, and Raymond Maugis, Garges-les-Gonesse, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 26, 1976, Ser. No. 670,912

Claims priority, application France, Mar. 26, 1975, 75 09446

Int. Cl.[2] G01S *9/02*

U.S. Cl. 343—5 PD **9 Claims**



1. In an anti-intrusion Doppler effect mini-radar comprising means for generating and transmitting a pure microwave signal, means for detecting and demodulating microwave energy and coupled to receive the microwave energy transmitted by the mini-radar and to receive the microwave energy reflected towards the mini-radar, means for amplifying the Doppler frequency shift signals at the output of said detecting and demodulating means resulting from the demodulation of microwaves reflected from objects in motion, an alarm control circuit connected to receive the amplified Doppler frequency shift signals; the improvement comprising a servo-control circuit responsive to the level of signals applied to said alarm control circuit for controlling the gain of said amplifying means and a timing circuit responsive to a sudden increase in signal level in said amplifying means for blocking said servo-control circuit and inhibiting the operation of said alarm control circuit for a determined time period following said sudden increase in signal level.

4,090,196

INVERSE GAIN MODULATOR

Howard R. Stevenson, Jr., Herkimer, N.Y., assignor to General Electric Company, Utica, N.Y.

Continuation of Ser. No. 104,636, Jan. 7, 1971, abandoned. This application Dec. 20, 1973, Ser. No. 427,760

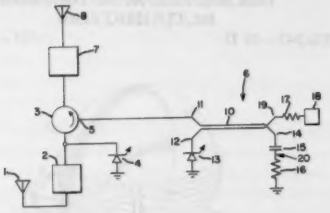
Int. Cl.[2] G01S *7/38, 9/02, 9/56*; H04K *3/00*

U.S. Cl. 343—5 R **9 Claims**

8. A system for receiving an rf input signal and transmitting an rf output signal of the same frequency comprising in combination:

quadrature hybrid circuit means connected to receive said input signal and to generate said output signal in response thereto: and

loading means provided at at least two ports of said quadrature hybrid circuit means, said loading means constructed and arranged such that the relative loading at said two



ports is unbalanced for input signals of a predetermined amplitude and is balanced for input signals of a relatively higher amplitude whereby the amplitude of said output signal is varied inversely with respect to the amplitude of said input signal.

4,090,197

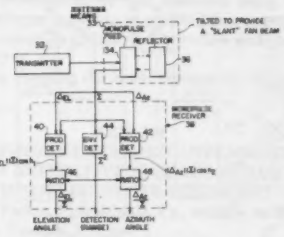
MONOPULSE, FAN-BEAM, SEARCH-RADAR SYSTEM WITH IMPROVED HEIGHT AND AZIMUTH DETERMINATION

Ben H. Cantrell, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 24, 1977, Ser. No. 800,114

Int. Cl.[2] G01S *9/22*

U.S. Cl. 343—16 M **8 Claims**



1. A monopulse, fan beam, search-radar system in which multipath signals are received only when a target is in a multipath region located at low elevation angles, which comprises:

transmitter means for producing pulses of electromagnetic wave energy;

antenna means for radiating said pulses and receiving target return signals, said antenna means forming a narrow-azimuth fan beam whose center line is aimed at the horizon and whose central plane is tilted at an angle of from 30° to 60° from the vertical plane, said antenna means including a sum receiving channel and an elevation-difference receiving channel for providing a sum signal and an elevation difference signal, respectively, from the target return signals; and

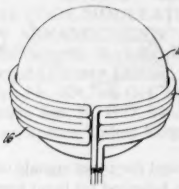
monopulse-receiver means coupled to said antenna means for receiving said sum signals and said elevation-difference signals, said monopulse-receiver means providing an elevation angle signal and a range signal corresponding to the elevation angle and range of the target.

4,090,198

PASSIVE REFLECTANCE MODULATOR

Eugene T. Canty; Russell P. Tow, both of Santa Barbara, Calif.; Frank J. Spayth, Milwaukee, Wis.; Richard A. Morrow, Chapel Hill, N.C., and Charlie B. Smith, Santa Ana, Calif., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 31, 1964, Ser. No. 394,648
Int. Cl.² H01Q *15/02*
U.S. Cl. 343—18 D **7 Claims**



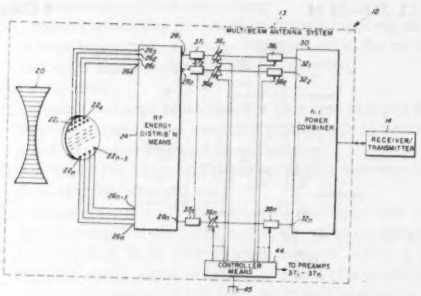
1. A reflectance modulator exhibiting an omni-azimuthal reflectance pattern comprising a microwave lens for focusing electromagnetic energy, a plurality of reflector means positioned on a focal surface of said lens and including a gaseous plasma, means for sequentially controlling the ionization level of said plasma to modulate the reflectance of said energy.

4,090,199

RADIO FREQUENCY BEAM FORMING NETWORK

Donald H. Archer, Santa Barbara, Calif., assignor to Raytheon Company, Lexington, Mass.

Filed Apr. 2, 1976, Ser. No. 673,169
Int. Cl.² H01Q *3/26*
U.S. Cl. 343—100 SA **13 Claims**



4. In a radio frequency communication system wherein a beam forming network is adapted to form a plurality of independent beams, each one being associated with a corresponding one of a plurality of antenna feed elements, selected ones of such beams being formed in response to control signals supplied to such beam forming network, the improvement comprising:

(a) a radio frequency lens having a focal plane, the antenna elements being disposed in such focal plane;

(b) means, coupled to the plurality of antenna feed elements, for distributing radio frequency energy applied to any one of the antenna feed elements to a plurality of outputs of such means; and

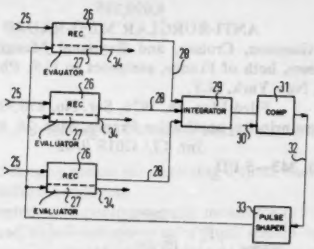
(c) means, coupled to the distributing means through a plurality of different paths, including a plurality of active elements disposed in said different paths, for maximizing the power transfer between selected ones of the plurality of antenna feed elements and the receiver/transmitter in response to said control signals, the selected ones of the plurality of feed elements forming corresponding beams along different directions.

4,090,200

METHOD FOR THE COMPARATIVE VECTOR MEASUREMENT OF SIGNAL PULSES ARRIVING NEARLY SIMULTANEOUSLY AT SEVERAL RADIO RECEIVING STATIONS

Dieter Leypold, Munich; Erwin Vachenauer, Haar, and Klaus v. Pieverling, Wolfratshausen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 6, 1975, Ser. No. 629,284
Claims priority, application Germany, May 27, 1975, 2523504
Int. Cl.² G01S *1/44*
U.S. Cl. 343—106 R **5 Claims**



1. In a method for the comparative vector measurement of keyed radio signal pulses which arrive nearly simultaneously at several receivers, in particular DME pulses, which can exhibit greatly fluctuating level differences, in which the pulses are fed to a level reducing circuit having automatically stepped adjustment in response to each increase over a definite threshold during the rising of the leading edge of a signal pulse and in which the instantaneous amplitudes of the received measuring signals are measured at a specific measuring time common to all receivers, the improvement therein comprising the steps of:

deriving in each receiver a special switching pulse from each step adjustment caused by exceeding the definite threshold in the respective receiver;

applying the special switching pulses to a retriggerable monostable multivibrator to retrigger and hold the same in its unstable condition, the monostable multivibrator having a specific return time to its stable condition;

blocking the step adjustment after the measuring time; and

selecting a measuring time with respect to the arrival sequence of the radio pulses as a common measuring time for simultaneous measurement for the receiving vectors of all of the receivers.

4,090,201

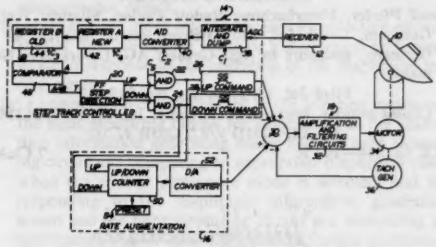
RATE AUGMENTED STEP TRACK SYSTEM

John G. Whitman, Jr., Melbourne, Fla., assignor to Harris Corporation, Cleveland, Ohio

Filed Sep. 8, 1976, Ser. No. 721,386
Int. Cl.² G01S *3/44*
U.S. Cl. 343—117 R **9 Claims**

6. A method for controlling antenna tracking comprising the steps of cyclically providing a step command having a predetermined magnitude and a selectable polarity to an antenna drive servo motor, selecting the polarity such that the antenna is stepped to maximize returns, supplying a servo command to

the servo motor indicative of continuous motion, accumulating the time integral of the polarities of the step commands, and



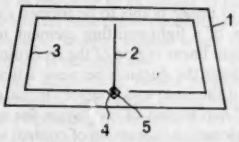
varying the magnitude of the servo command in response to the time integral.

4,090,202

MULTIBAND ANTENNA FOR AUTOMOBILE WINDSHIELD

Mauro Comastri, Monza, and Giorgio Ciarniello, Vasto (Chieti), both of Italy, assignors to Societa Italiana Vetro SIV S.p.A., Vasto (Chieti), Italy

Filed Jul. 26, 1976, Ser. No. 708,761
Claims priority, application Italy, Jul. 24, 1975, 50648 A/75
Int. Cl.² H01Q *1/32*
U.S. Cl. 343—713 **4 Claims**



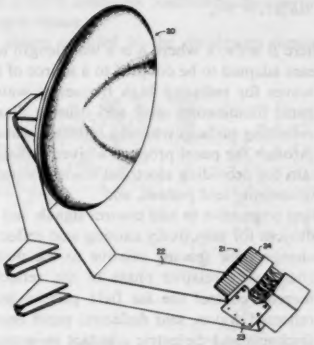
1. In a multi-band receiving antenna supported on a windowpane having a rim and suitable for a radio-receiving set having a single antenna input terminal, which antenna includes a fishpole-type section which prevalently contributes to reception of the metric wave band and which is connected to the terminal and a frame section which runs parallel to the rim of the windowpane and prevalently contributes to reception of the medium wave band, the improvement wherein said frame section consists of a single conductor having a free end and running along parallel to and in close vicinity from said rim, and means for adapting the impedance of the metric wave section comprising a spirally formed conductive extension of said single conductor of said frame section of the antenna connected between said terminal and said single conductor, such as to form an inductance of from substantially 0.2 to substantially 0.5μH over an area of from substantially 5 to substantially 15 cm^2, said free end of said single conductor terminating in the vicinity of said spirally formed extension, whereby each of the sections contributes in substantial measure, in the order of 10 to 20%, to reception of signals having frequencies included in that band which is prevalently received by the other section.

4,090,203

LOW SIDELOBE ANTENNA SYSTEM EMPLOYING PLURAL SPACED FEEDS WITH AMPLITUDE CONTROL

James W. Duncan, Placentia, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Sep. 29, 1975, Ser. No. 617,563
Int. Cl.² H01Q *3/26*
U.S. Cl. 343—753 **14 Claims**



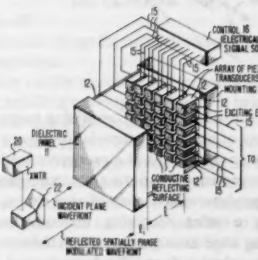
1. A low sidelobe antenna system comprising:
a. an odd number of substantially identical regularly spaced radiating elements arranged in a predetermined planar geometric pattern and forming a basic subarray;
b. means for feeding each of said radiating elements with a wave to be radiated in such a manner that said elements are electrically in phase and that each element is fed with a predetermined power, the power fed to said radiating elements being different, a plurality of said basic subarrays are superimposed over each other to form an array generating a beam of predetermined configuration and the spacing between all of said elements being equal, the power and spacing being so selected that a resulting beam has a substantially Gaussian distribution with substantially no sidelobes; and
c. means for focusing the beam radiated by said elements.

4,090,204

ELECTRONICALLY STEERED ANTENNA SYSTEM USING A REFLECTIVE SURFACE FORMED OF PIEZOELECTRIC TRANSDUCERS

Nabil Hassan Farhat, Philadelphia, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Sep. 1, 1976, Ser. No. 719,402
Int. Cl.² H01Q *19/10, 3/20*
U.S. Cl. 343—754 **2 Claims**



1. An electronically steerable antenna system for high frequency waves comprising:

an array of electromechanical displacement devices, each device having a high frequency wave reflecting surface with said reflecting surfaces closely spaced to each other forming substantially a total radio frequency wave reflecting surface,

a flat dielectric panel spaced a given distance from the reflecting surface of the devices, the thickness of the panel l_1 and the relative dielectric constant ϵ_r of the panel material is such that,

$$\tan \beta l_1 = \sqrt{\epsilon_r}$$

where β is $2\pi/\lambda$ where λ is a wavelength in the panel,

means adapted to be coupled to a source of radio frequency waves for radiating high frequency waves toward said panel illuminating same and causing illumination of the reflecting surfaces whereby reflected waves coupled back through the panel produce a given radiated pattern,

means for providing electrical control signals for changing or steering said pattern, and

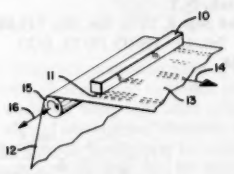
means responsive to said control signals and coupled to said devices for selectively causing said reflecting surfaces to change their spacing relative to the dielectric panel to change the relative phase of the reflected waves and thereby control the far field pattern produced by the reflected waves, said dielectric panel being of a specific thickness and dielectric constant to increase the relative phase changes produced by the devices.

4,090,205

APPARATUS AND METHOD FOR JET DROP PRINTING

Harold W. Huffman, Fairfield, Ohio; Richard H. Lyon, Belmont, Mass.; David G. Holmes, Potsdam, N.Y., and John W. Donahue, Bellbrook, Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Apr. 6, 1977, Ser. No. 785,059
Int. Cl.[2] G01D *15/18, 15/24*
U.S. Cl. 346—75 **15 Claims**



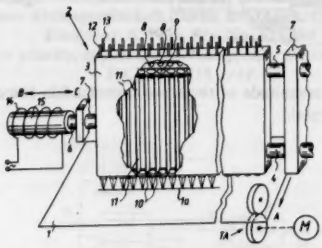
1. A jet drop recording system comprising means for generating a spaced row of liquid jets, stimulation means for causing said jets to break up into drops at a predetermined frequency, catching means responsive to printing control signals for selectively catching predetermined ones of said drops, and means for transporting a print receiving medium longitudinally through a printing zone to cause deposition thereon of those of said drops not caught as aforesaid, characterized in that said transporting means oscillates said print receiving medium laterally to produce lateral overlapping of drop deposits from adjacent jets.

4,090,206

METHOD AND APPARATUS FOR PRODUCING SUCCESSIVE LINES OF IMAGE POINTS ON A RECORDING MEDIUM

Josef Pfeifer, Unterhaching; Rudolf Paulus, Munich; Walter Gutmann, Lochhofen, and Michael Resch, Munich, all of Germany, assignors to Agfa-Gevaert AG, Leverkusen, Germany

Filed Jul. 13, 1977, Ser. No. 815,413
Claims priority, application Germany, Jul. 15, 1976, 2631850
Int. Cl.[2] G01D *9/42;* **G03B** *41/00*
U.S. Cl. 346—107 R **7 Claims**



3. A recorder operative for forming successive transverse lines of image points on the surface of a recording medium, comprising, in combination, light source means; a transport arrangement operative for effecting relative movement between the light source means and the recording medium in a direction transverse to the direction in which a line of image points to be formed extends, the light source means comprising a row of light-emitting elements extending parallel to the direction in which the line of image points to be formed extends; optical means operative for projecting onto the line on the recording medium on which the line of image points is to be formed reduced-scale images of the light-emitting elements; an oscillatory-motion generator operative for oscillating at least one of said means in a direction parallel to the direction in which the line of image points to be formed extends and causing each image of a light-emitting element to sweep over a respective straight linear region of the recording medium equal in length to at least the distance between adjoining light-emitting elements of the row; and control circuit means operative during each n^{th} half-period of oscillation for applying to each light-emitting element a succession of control signals determining a succession of adjoining image points to be formed within the straight linear region associated with the respective light-emitting element.

4,090,207

PHOTOGRAPHIC INFORMATION INDICATION DEVICE

Yukio Mashimo, Tokyo, and Tadashi Ito, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1975, Ser. No. 618,111
Claims priority, application Japan, Oct. 4, 1974, 49-114366
Int. Cl.[2] G03B *7/08, 17/20*
U.S. Cl. 354—23 D **8 Claims**

1. A photographic information indication device for a camera with a diaphragm and a shutter and a view finder, comprising:

(a) diaphragm setting means for manually setting the diaphragm;

(b) diaphragm information generating means coupled to said diaphragm setting means to produce an electric signal corresponding to the set diaphragm;

(c) shutter time setting means for manually setting the shutter;

(d) shutter time information generating means coupled with

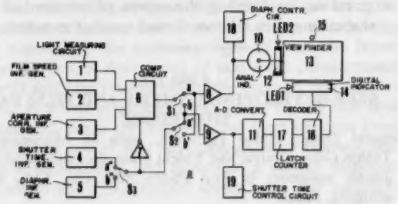
said shutter time setting means to produce an electric signal corresponding to a set value of the shutter time;

(e) light measuring circuit which produces an electric signal corresponding to the quantity of light coming from a photographic object,

(f) photographic mode selecting means for selecting either a shutter time preference mode or a diaphragm preference mode in response to the operation of the diaphragm setting means,

(g) a computation circuit coupled to the selecting means and the light measuring circuit for responding to the shutter time information generating means and the light measuring circuit and computing an appropriate diaphragm value when the shutter preference mode is selected, and for responding to the diaphragm information generating means and the light measuring circuit and computing an appropriate shutter time when the diaphragm preference mode is selected;

(h) said selecting means alternately coupling one of said information generating means to said computation circuit;



(i) analog indication means connected to the computation circuit and said diaphragm information generating means to indicate an analog value corresponding to the diaphragm information;

(j) a digital indication means connected to the computation circuit and said shutter time information generating means to digitally indicate a value corresponding to the shutter time;

(k) diaphragm controlling means coupled to the diaphragm information generating means and the computation circuit for operating in response to an output of the computation circuit in the shutter time preference mode and in response to the diaphragm setting means when the diaphragm preference mode is selected and

(l) a shutter time controlling means coupled to the diaphragm information generating means and the computation circuit for operating in response to an output from the shutter time setting means in the shutter time preference mode and in response to an output of the computation circuit when the diaphragm preference mode is selected.

4,090,208

ELECTRONIC EXPOSURE CONTROL APPARATUS FOR CAMERAS

Nobuhiko Shinoda, Tokyo; Tadashi Ito, Yokohama; Soichi Nakamoto, Machida, and Fumio Ito, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 529,241, Dec. 3, 1974, abandoned. This application Sep. 28, 1976, Ser. No. 727,628

Claims priority, application Japan, Dec. 11, 1973, 48-139786; Dec. 11, 1973, 48-139787; Dec. 11, 1973, 48-013978

Int. Cl.² G03B 7/08

U.S. Cl. 354—38 **14 Claims**

1. An electronic exposure control apparatus for a camera having a diaphragm comprising:

(a) light sensitive means for producing a first analog signal corresponding to the brightness of an object to be photographed;

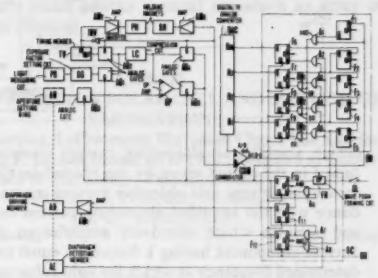
(b) signal forming means for producing a gradually varying second analog signal;

(c) comparison means having a first terminal for receiving the first analog signal and a second terminal for receiving the second analog signal, said comparison means comparing the first analog signal with the second analog signal and producing a first control signal when the first and second analog signals reach a predetermined relationship;

(d) first gate means connected with the comparison means and the signal forming means for discontinuing the variation of the second analog signal in said signal forming means when said comparator means applies the first control signal to the first gate means so as to store the second analog signal in said signal forming means;

(e) diaphragm control means for controlling the aperture of the diaphragm means;

(f) detecting means coupled to the diaphragm means for



detecting the aperture size and producing a third analog signal corresponding to the aperture size;

(g) selector means for alternately coupling the light sensitive means and the detecting means with the first terminal of said comparison means so that said comparison means compares the third analog signal with the second analog signal stored in the signal forming means when the selector means couples the detecting means to the first terminal and produces a second control signal when said two signals reach a predetermined relationship, and

(h) second gate means connected with the comparison means and the diaphragm control means for inhibiting operation of said diaphragm control means when the second control signal is applied to said second gate means.

4,090,209

AUTOMATIC IMAGE FOCUSING SYSTEM FOR CAMERAS

Toshihiro Kondo, Kamiishihara, Chofu-shi, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara and Toshihiro Kondo, Tokyo, both of, Japan

Filed Dec. 27, 1976, Ser. No. 754,699

Claims priority, application Japan, Dec. 26, 1975, 50-157495; Feb. 12, 1976, 51-14322; Aug. 3, 1976, 51-92473; Aug. 4, 1976, 51-92894

Int. Cl.² G03B 3/10

U.S. Cl. 354—25 **4 Claims**

1. An automatic image focusing device for use in a camera or the like comprising:

an objective axially movable for focusing,

means for axialling moving the objective in accordance with an electric signal given thereto,

a light refracting optical element located substantially on an image plane of the objective, said light refracting optical element being fixed to a transparent plate extending parallel to said image plane and the transparent plate being periodically moved in a plane parallel to the image plane,

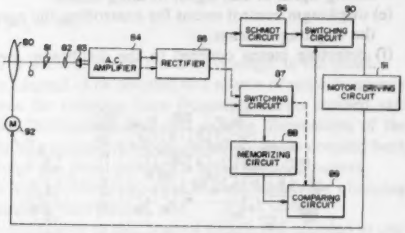
means for periodically moving said light refracting optical element in a plane parallel to said image plane at a predetermined frequency,

a photodetector located behind said light refracting optical element for receiving light passing therethrough and giv-

ing an output representing the quantity of light received thereby,

a focusing lens provided between the light refracting optical element and the photodetector for focusing an image formed on said image plane onto said photodetector, and

an electric control circuit connected between the photodetector and said means for moving the objective, said control circuit including an alternating current amplifier



which amplifies an alternating current component contained in the output given by the photodetector, a drive means for driving said objective moving means in accordance with the amplified alternating current component, and a means which selectively amplifies an alternating current component having a frequency equal to said predetermined frequency at which the light refracting optical element is periodically moved.

4,090,210

SWIVEL SUPPORT FIXTURE FOR LAMP

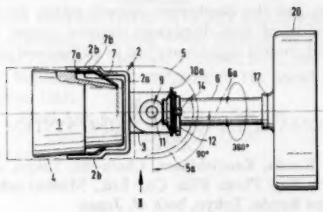
Karl Wehling, Lignitzer Str. 9, and Karlheinz Brechelt, Leipziger Str. 4, both of 492 Lemgo, Germany

Filed Oct. 20, 1975, Ser. No. 624,094

Claims priority, application Germany, Oct. 19, 1974, 2449721

Int. Cl.[2] F21S *1/12*

U.S. Cl. 362—419 **6 Claims**



1. A swivel and tilt mechanism for support of a lamp, comprising:

a fixed conduit member through which electric wires for said lamp may be conducted, said conduit member having a collar member near one end thereof;

a generally L-shaped unitary member having one leg with an aperture rotatably surrounding said conduit member for rotation about the axis of said conduit member, said L-shaped member being frictionally engaged on one side of said one leg by a lock member which also frictionally engages said conduit member and on the other side of said one leg by said collar member, said lock member comprising a generally cup-shaped portion with a central aperture and a plurality of radial slits extending part way outwardly from said central aperture to provide thereby a plurality of resilient, inwardly directed fingers whose inner ends frictionally engage the outer circumference of said conduit member to force said L-shaped member and said collar into frictional engagement whereby said L-shaped member may be adjustably positioned relative to said conduit member;

a support member having an aperture alignable with an aperture formed in a second leg of said L-shaped member;

a pivot pin extending through said aligned apertures allowing rotation of said support member about a second axis perpendicular to said axis of said conduit member, and a further lock member which frictionally engages said support member and said pivot pin, said further lock member comprising a further generally cup-shaped portion with a central aperture and a plurality of radial slots extending part way outwardly from said central aperture to provide thereby a further plurality of resilient, inwardly directed fingers whose inner ends frictionally engage the outer circumference of said pivot pin to force said support member and said second leg into frictional engagement whereby said support member may be adjustably positioned relative to said second leg;

a hood member detachably connected to said support member; and

stop means for limiting the extent of rotation of said L-shaped member relative to said conduit member.

4,090,211

SELF-DEVELOPING CAMERA AND FILM PACK THEREFORE

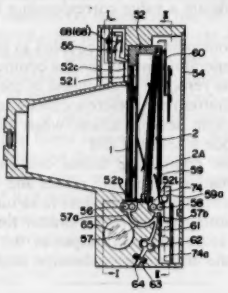
Yasushi Oishi; Hideo Horiuchi, both of Minami-ashigara; Toshio Goto, Omiya, and Yoichi Hamada, Nishinomiya, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Nov. 27, 1974, Ser. No. 527,779

Claims priority, application Japan, Dec. 29, 1973, 49-877; Dec. 29, 1973, 49-878; Dec. 29, 1973, 49-879

Int. Cl.[2] G03B *17/50, 17/26*

U.S. Cl. 354—86 **7 Claims**



5. A photographic camera for use with a film assembly of the type including a film pack having a light-transmitting area adapted to be aligned with the optical axis of an objective lens assembly of the photographic camera when said film pack is loaded in said camera, said film pack having front and rear compartments in terms of film exposure direction divided by an intermediate wall member urged in one direction towards said light-transmitting area within said film pack, said film pack accommodating a plurality of first sheets, held in stacked, but light-shielding relation to each other and housed within said front compartment, each of said first sheets having a photosensitive layer exposable to a target object to be photographed through said light-transmitting area by way of said objective lens assembly thereby to form thereon a latent image of said target object, and second sheets equal in number of said first sheets, said second sheets being housed within said rear compartment in stacked relation to each other, each of said second sheets having dimensions generally matching those of said first sheets and further having a breakable container for processing solution carried at one end thereof, and means for guiding

successively said first sheets one at a time from said front compartment towards said rear compartment such that any one of said first sheets after having been exposed to the light coming through the objective lens assembly by way of said light-transmitting area is drawn out of said front compartment in a first endwise direction and then turned over approximately 180° into said rear compartment, said first sheet thus drawn being, when entering said rear compartment, moving in a second direction opposed to said first direction, said first sheet so transported to said rear compartment being held in facing contact with the rearmost one of said second sheets to form a semi-film unit, said photographic camera comprising, in combination:

means for positioning the film pack in said photographic camera with the foremost one of said first sheets in terms of exposure direction facing said objective lens assembly through said light-transmitting area of said film pack;

means for transporting any one of said first sheets from said front compartment towards said rear compartment along a first passage extending between said front compartment and said rear compartment, said first passage being so shaped that, when any one of said first sheets, after having been exposed to the incoming light to form the latent image thereon, is drawn out of said front compartment towards said rear compartment, the exposed first sheet is moved in a first direction towards one end of said first passage and, when said exposed first sheet emerges from the opposed end of said first passage, said exposed first sheet is turned over and moved in a second direction opposed to said first direction towards the rear compartment;

means for operating said transporting means so as to cause said exposed first sheet to be transported towards the rear compartment in response to completion of exposure of the foremost one of said first sheets to form the latent image thereon through the objective lens assembly;

means for ejecting said semi-film unit out of said rear compartment and then out of said photographic camera in response to completion of insertion of said exposed first sheet into said rear compartment to form said semi-film unit, said semi-film unit when ejected thereby being moved along a second passage in a direction opposed to the direction of insertion of said exposed first sheet into said rear compartment, said second passage extending from said rear compartment to the outside of said photographic camera and having one end adjacent an elongated slot defined at one end of said film pack, through which elongated slot said semi-film unit is drawn out of said rear compartment, a portion of said second passage adjacent said one end thereof adjoining that end of said first passage through which said exposed first sheet being guided along said first passage emerges from said first passage; and

means disposed on said second passage for applying to said semi-film unit being moved along said second passage a squeezing pressure necessary to break the processing solution container to cause the latter to spread over between said exposed first sheet and said associated second sheet forming said semi-film unit thereby developing the visually identifiable image coresponding to the latent image.

4,090,212

IMAGING DEVICE

Dennis William George Byatt, Great Baddow, and Harold Thomas Brown, Hatch End, both of England, assignors to The Marconi Company Limited, Chelmsford, England

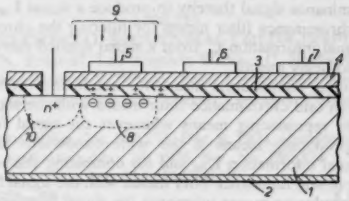
Filed Mar. 24, 1977, Ser. No. 780,698

Claims priority, application United Kingdom, Mar. 27, 1976, 12414/76

Int. Cl.² H01L *29/78*

U.S. Cl. 357—24 **4 Claims**

1. An imaging device including a p-type or n-type semiconductor substrate having one major surface which carries a layer of insulating material which in turn is overlaid by a layer



of electrically poled plastics material on which an array of electrodes is disposed.

4,090,213

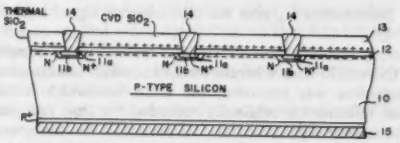
INDUCED JUNCTION SOLAR CELL AND METHOD OF FABRICATION

Joseph Maserjian, LaCrescenta; Shy Shiun Chern, Los Angeles, and Seung P. Li, San Dimas, all of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed Jun. 15, 1976, Ser. No. 696,374

Int. Cl.² H01L *27/14*

U.S. Cl. 357—30 **21 Claims**



1. An induced junction solar cell comprising

a substrate of p-type semiconductor material,

a pattern of current collecting stripes on one broad side of said substrate diffused with n-type impurities,

a film of dielectric material on said one side of said substrate,

a layer of dielectric material produced over said dielectric film,

a uniform concentration of positive ions implanted in said dielectric layer,

a pattern of metal conductors in ohmic contact with said current collecting stripes, and

a film of metal in ohmic contact with said substrate on the other side of said substrate opposite said one side.

4,090,214

ALTERNATING LINE VIDEO RECORDER/REPRODUCER

Charles Edward Wright, Escondido, Calif., assignor to Eastman Technology, Inc., Rochester, N.Y.

Filed Jun. 14, 1976, Ser. No. 695,888

Int. Cl.² H04N *5/76*

U.S. Cl. 358—4 **2 Claims**

1. Apparatus for reconstructing a color television signal from signals recorded on a record medium, the recorded signals comprised of wide bandwidth luminance signal information for alternate field lines and narrow bandwidth luminance signal information plus chrominance signal information for the remaining field lines, said apparatus comprising:

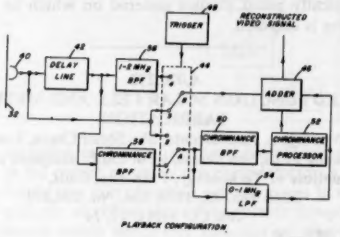
(a) means for reproducing the signals recorded on the record medium, the signals comprised of wide bandwidth luminance signal information L_W alternating with narrow bandwidth luminance signal information L_N plus chrominance signal information C';

(b) means for introducing a one horizontal scan line time delay to the signal reproduced from the record medium;

(c) luminance filter means for filtering out of a signal applied thereto from said delay means the information contained in the frequency range occupied by the narrow bandwidth luminance signal thereby to produce a signal L_W;

(d) chrominance filter means for filtering the chrominance signal information C′ from a signal applied thereto from said delay means;

(e) signal combination means for combining the signal C′ from said chrominance filter means with the signal from said reproducing means whenever the signal from said reproducing means is the wide bandwidth luminance signal information L_W, and for combining the signal L_W from said luminance filter means with the signal from said reproducing means whenever the signal from said reproducing means is the narrow bandwidth luminance signal



information L_N plus the chrominance signal information C′,

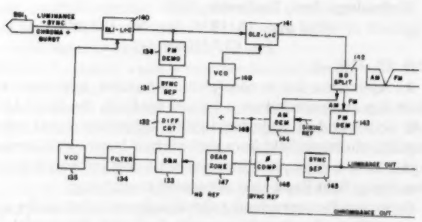
whereby a color television signal is reconstructed comprising, for those field lines wherein wide bandwidth luminance signal information was recorded, the wide bandwidth luminance signal information originally recorded for that line plus the chrominance signal information recorded for the preceding line, and for those lines wherein the narrow bandwidth luminance signal information plus the chrominance signal information was recorded, the reconstructed color television signal comprises the narrow bandwidth luminance signal information and the chrominance signal information originally recorded for that line plus that portion of the wide bandwidth luminance signal information recorded for the previous line which does not overlap the frequency band of the narrow bandwidth luminance signal information.

4,090,215

ELECTRONIC TIME BASE ERROR CORRECTION METHODS AND ARRANGEMENTS

William A. Buchan, Newport Beach, and Rainer E. an der Heiden, Anaheim, both of Calif., assignors to BASF Aktiengesellschaft, Ludwigshafen am Rhein, Germany

Filed Oct. 1, 1976, Ser. No. 728,550
Int. Cl.² H04N *5/795*
U.S. Cl. 358—8 **26 Claims**



1. An electronic time base error correction method for color video recording systems, comprising:

a. providing a recorded color video signal in which luminance information and sync information are carried in one frequency band and chrominance information and color burst information are carried in a different frequency band;

b. providing, in playback, at least one channel having first and second channel portions, for the luminance and sync information and for the chrominance and burst information, respectively; and

c. providing feedback loops for the control of the signal delay in said at least one channel, at least one of said feedback loops deriving from the sync information in said first channel portion a coarse-correction for the color video signal and another of said feedback loops deriving from the burst information in said second channel portion a fine-correction for the color video signal

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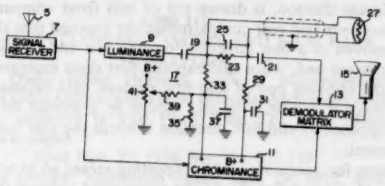
4,090,216

AMBIENT LIGHT CONTRAST AND COLOR CONTROL CIRCUIT

Douglas W. Constable, Batavia, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed May 26, 1976, Ser. No. 689,997
Int. Cl.² H04N *9/535*
U.S. Cl. 358—21 **10 Claims**



1. In a color television receiver having luminance and chrominance signal channels and a DC potential source, an ambient light contrast and color control circuit comprising:

an ambient light responsive device; and

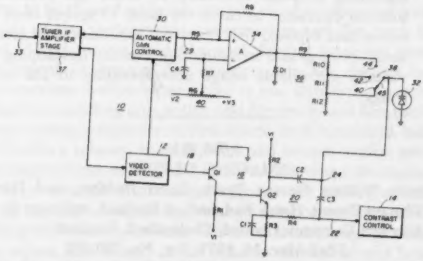
circuit means for AC coupling said ambient light responsive device in said luminance signal channel to effect signal contrast variations and DC coupling said ambient light responsive device to said DC potential source and to said chrominance signal channel to effect color signal variations in accordance with variations of said ambient light responsive device.

4,090,217

AUTOMATIC SHARPNESS CONTROL CIRCUIT FOR A TELEVISION RECEIVER

Shri K. Goyal, and Leo I. Bluestein, both of Bedford, Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Aug. 23, 1976, Ser. No. 716,604
Int. Cl.² H04N *9/535, 5/14*
U.S. Cl. 358—37 **8 Claims**



1. A sharpness control circuit for a color television receiver of the type having a variable frequency response device for processing a demodulated video signal to establish the peaking

of the frequencies including the video signal, said variable frequency response device including an input for receiving said demodulated video signal, an output for providing said demodulated video signal, and a control terminal, the improvement comprising a voltage controlled reactive impedance element connected to said control terminal for varying the frequency response of said device; a voltage divider; manually operable switch means connected to said voltage divider and to said reactive impedance element for selectively connecting predetermined portions of said voltage divider in parallel with said reactive impedance element; and coupling means connected to said voltage divider and to a gain control circuit in said television receiver for providing a gain control voltage across said voltage divider in response to the signal strength of a video signal received by said television receiver, said coupling means including an amplifier for amplifying the gain control voltage to a usable level and means for establishing a threshold level for the gain control voltage below which the gain control voltage does not control the sharpness of the picture.

4,090,218

METHOD OF, AND APPARATUS FOR, MANUFACTURING A VIDEO RECORD

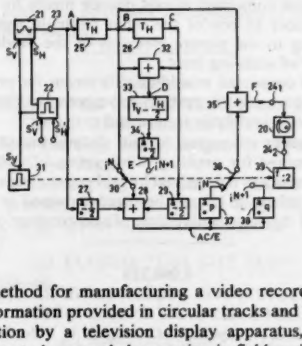
Marinus Cornelis Willem van Buul; Jan August Marcel Hofman; Leendert Johan van de Polder, and Sing Liong Tan, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 579,016, May 19, 1975, abandoned. This application Mar. 15, 1976, Ser. No. 666,691

Claims priority, application Netherlands, Mar. 24, 1975, 7503461; Aug. 10, 1975, 7511784

Int. Cl.² H04N *5/14, 5/76, 5/14*

U.S. Cl. 358—37 **24 Claims**



1. A method for manufacturing a video record containing video information provided in circular tracks and intended for reproduction by a television display apparatus, said video information to be recorded occurring in field periods and line periods, two successive field periods comprising an interlaced picture in the display device, said display apparatus being capable of selectively displaying more than two successive field periods for producing a television picture containing motion and for repeatedly displaying two sequentially recorded field periods for obtaining a stop-motion television picture, said method comprising dividing said video information to be recorded in groups of two consecutive fields, phase delaying at least one of said two consecutive fields by at least one horizontal line period, combining as a first combined signal the video information directly from a first of said two consecutive fields with the phase delayed video information from one of said two consecutive fields to be recorded, recording said first combined signal on a semi-circular portion of a first track of said record, combining as a second combined signal the second of said two consecutive fields to be recorded with the phase delayed information from one of said two consecutive fields to be recorded, and recording said second combined signal in the unrecorded semicircular portion of said first track, at least one of said first and second combined signals being a combination of both of said first and second consecutive signals.

4,090,219

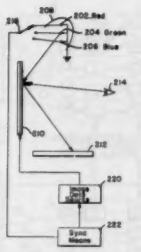
LIQUID CRYSTAL SEQUENTIAL COLOR DISPLAY

Michael N. Ernstoff, Los Angeles; William C. Hoffman, Torrance, and Richard N. Winner, Palos Verdes Peninsula, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 530,775, Dec. 9, 1974, abandoned. This application May 26, 1976, Ser. No. 690,324

Int. Cl.² H04N *9/30*

U.S. Cl. 358—59 **5 Claims**



1. A liquid crystal field sequential color display system for receiving an applied video signal from a video data source and providing a color display to an observer comprising:

liquid crystal display panel means having a multiplicity of liquid crystal cells;

addressing means for selectively energizing individual liquid crystal cells with an applied video signal associated with each of a plurality of primary colors to provide a display pattern for each of said plurality of primary colors characterized by variations in the reflectivity of individual cells over the surface of said display panel;

means for displaying the display pattern associated with each of said plurality of primary colors during repetitive intervals, said means for displaying including means for providing illumination of said liquid crystal display panel by each of said primary colors; and

means for synchronizing the display pattern associated with each of said primary colors with the illumination of said display panel by the associated primary color.

4,090,220

WIRED BROADCASTING SYSTEMS FOR PROCESSING CODED DATA REPRESENTATIVE OF SUBSCRIBER STATION CONDITIONS

Eric John Gargini, West Drayton, England, assignor to Communications Patents Limited, London, England

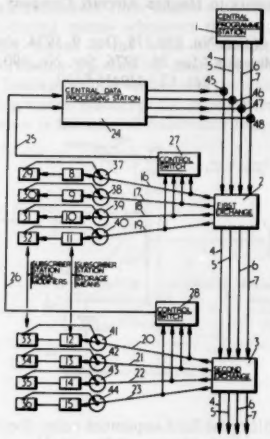
Continuation-in-part of Ser. No. 487,190, Jul. 10, 1974, abandoned, which is a continuation of Ser. No. 307,613, Nov. 17, 1972, abandoned. This application Sep. 21, 1976, Ser. No. 725,338

Int. Cl.² H04N *7/10*

U.S. Cl. 358—86 **13 Claims**

1. A wired broadcasting system in which each of a group of subscriber's stations is connected to a programme exchange through a signal path which comprises two pairs of conductors respectively for the transmission of high frequency television signals and lower frequency audio and control signals, controlling switch means at the programme exchange and operable by control signals generated by a subscriber to make a progamme selection and to apply to the subscriber's high frequency conductor pair any selected one of a number of programmes, means at said subscriber station for communicating control signals over said lower frequency conductor pair to operate said controlling switch means to select a desired one of said

programmes at said programme exchange, a central data processing station for sending coded signal data to said programme exchange with the video signals of each of said programmes and coupled by said controlling switch means through the higher frequency conductors to the subscriber station, whereby said coded data is sent to each subscriber station from said programme exchange over said higher frequency conductors along with vision signals of any selected one of said programmes, and means located at subscriber's stations for modifying data received from said central data processing station with local data and returning through further control switch means said modified data over said high frequency conductors to said central data processing station at a frequency different from that at which data is received at said subscriber station.

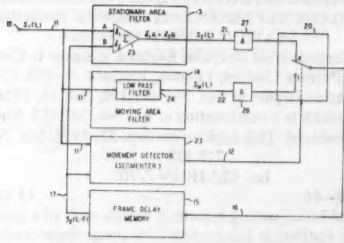


4,090,221

APPARATUS FOR IMPROVING VIDEO SIGNAL-TO-NOISE RATIO

Denis John Connor, New Shrewsbury, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 13, 1972, Ser. No. 234,169
Int. Cl.[2] H04N *7/12, 5/21*
U.S. Cl. 358—166 **11 Claims**



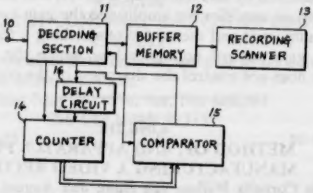
1. Apparatus for improving the signal-to-noise ratio in a video signal comprising means for storing a previously received video signal, means responsive to said video signal and said stored video signal for developing a combined signal, means responsive to said video signal for developing a bandwidth-limited signal, a movement detector responsive to said video signal and said stored video signal for developing a control signal, and a gating means responsive to said control signal for selectively coupling either said combined signal or said bandwidth-limited signal to an output terminal.

4,090,222

FACSIMILE SIGNAL RECEPTION SYSTEM

Yukio Nakagome, Yokohama; Hiroichi Teramura, Tokyo; Yasuhiro Yamazaki, Hiratsuka, and Yasushi Wakahara, Tokyo, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed Oct. 15, 1976, Ser. No. 732,600
Claims priority, application Japan, Oct. 16, 1975, 50-124717
Int. Cl.[2] H06N *1/40*
U.S. Cl. 358—280 **4 Claims**



1. A system for receiving an input facsimile signal, sometimes with dummy codes added for each predetermined number of scanning lines, comprising:

input terminal means for receiving said input facsimile signal;

decode means connected to said input terminal means for decoding said input facsimile signal for each information block of picture elements on the predetermined number of scanning lines;

count means connected to said decode means for counting the number of bits of the input facsimile signal corresponding to the picture elements of the predetermined number of scanning lines;

a receiver connected to said decode means for providing a record on a record medium in response to the decoded output of said decode means; and

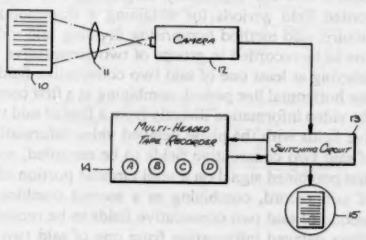
control means connected to said decode means and said count means for omitting subscanning of said receiver when the count determined by said count means is smaller than a reference bit number predetermined in consideration of the subscanning time of said receiver.

4,090,223

VIDEO SYSTEM FOR STORING AND RETRIEVING DOCUMENTARY INFORMATION

Arthur W. Holt, Annapolis, Md., assignor to Videofax Communications Corporation, Washington, D.C.

Filed Nov. 16, 1976, Ser. No. 742,171
Int. Cl.[2] H04N *1/36*
U.S. Cl. 360—35 **10 Claims**



1. A high-resolution video filing system for storing and retrieving documentary information, said system having a

storage mode in which each document to be filed is electro-optically scanned and magnetically recorded and a retrieval mode in which a selected recording is played back and displayed to recreate the document in readable form, said system comprising:

A. a high-resolution video camera for scanning each document to be filed to produce a video signal representing a single image frame having a predetermined number of scan lines in excess of 1,000;

B. a multi-headed magnetic tape recorder having a rotating head assembly whose series of heads are offset with respect to each other in a direction normal to the plane of rotation and act to successively sweep across a stationary magnetic tape to record thereon in the storage mode of the system a like series of parallel transverse tracks, each head being associated with a respective track, and in a retrieval mode to repeatedly play back the recorded tracks, said recorder including means to produce pulses representing the angular position of the rotating head assembly;

C. a high resolution video display device capable of reproducing said document in response to said video signal representing a single image frame;

D. electronic switching means coupled to said camera in the storage mode to divide said video signal representing a single image frame into fields equal in number to the number of said heads in said series thereof and to sequentially feed said fields to the respective heads of the recorder to record said fields on said tracks and to thereby produce a set thereof representing said document, and in the retrieval mode to sequentially feed the played-back fields to said display device to recreate said video signal representing a single image frame and thereby display said document; and

E. a synchronizing circuit responsive to the pulses representing the angular position of the head assembly to produce sync pulses for governing the operation of the electronic switching means.

4,090,224

APPARATUS FOR PREVENTING INADVERTENT ERASURE OF CASSETTE TAPE

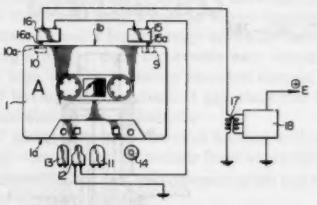
Masaaki Sato, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Aug. 20, 1976, Ser. No. 716,448

Claims priority, application Japan, Aug. 29, 1975, 50-118938[U]; Aug. 29, 1975, 50-118939[U]; Sep. 1, 1975, 50-120507[U]

Int. Cl.[2] G11B *15/04, 5/12, 23/08*

U.S. Cl. 360—60 **5 Claims**



1. In combination, a cassette tape recorder and a cassette therefor; the tape in said cassette having plural tracks;

said cassette having at least one erasure prevention lug extending therefrom;

said tape recorder having a record/playback head and tape drive means selectively providing rapid advance and rewind of the tape;

said tape recorder also having erasing means including a full tape width erasing head operable during said rapid advance and said rewind;

and detection means extending at least partially in the region of said lug for detecting the presence and absence of said lug;

said detection means being operably connected to said erasing means to disable full width erasure when the said lug is not present;

said lug being removable to prevent full width erasure of a record on the tape.

4,090,225

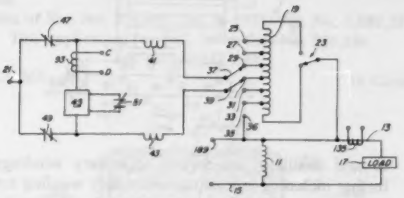
FAIL-SAFE CIRCUIT FOR TAP-CHANGING TRANSFORMER REGULATING SYSTEM

Clyde Gilker, South Milwaukee, and Arland D. Lamke, Franklin, both of Wis., assignors to McGraw-Edison Company, Elgin, Ill.

Filed Jan. 21, 1977, Ser. No. 761,011

Int. Cl.[2] H02H *7/22;* H02P *13/04*

U.S. Cl. 361—3 **12 Claims**



1. In a tap-changing transformer regulating system connecting a source of energy to a load and having a pair of movable tap contacts, a plurality of stationary contacts, a non-arcing switch to momentarily carry current while the line to one of the movable tap contacts that is to be transferred from one stationary contact to another is opened, the non-arcing switch then being opened to terminate current flow to the movable tap contact to permit its transfer without arcing, and an electrically energizable device to actuate the movable tap contact, the improvement of a fail-safe circuit responsive to undesired current conditions in the non-arcing switch to protect the transformer system and comprising:

monitoring means to detect current flow through the non-arcing switch and provide a reference signal indicative thereof;

input means to provide an input signal corresponding to the energizing voltage applied to the energizable device;

a fail-safe control switch closed upon opening of the non-arcing switch preparatory to a tap change;

output means; and

control means responsive to said reference signal and said input signal and operative upon closure of said fail-safe control switch to cause said output means to produce an output signal if current were not flowing through the non-arcing switch immediately prior to opening thereof and to produce an output signal if current continues to flow through the non-arcing switch for longer than a predetermined. time after opening thereof.

4,090,226

RELAY PROTECTION FOR CAPACITOR BANKS

Nils Torsten Fahlen; Jan Samuelsson, and Sture Ragnar Torseng, all of Vasteras, Sweden, assignors to ASEA AB, Vasteras, Sweden

Filed Oct. 15, 1976, Ser. No. 732,981

Claims priority, application Sweden, Jan. 27, 1976, 7600810

Int. Cl.[2] H02H *7/16*

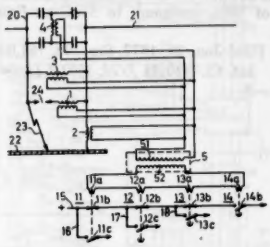
U.S. Cl. 361—16 **7 Claims**

1. Relay protection device for a capacitor bank having at least three measuring stations at a high voltage level for sensing a corresponding number of different disturbances associated with the capacitor bank, comprising:

an auxiliary transformer for each of said measuring stations,

each having a primary and a secondary winding, a primary winding of a respective auxiliary transformer being connected to a respective measuring station, each of said auxiliary transformers generating signals at the secondary winding thereof, the duration and level output of said signals being such that the signal with the highest level has the shortest duration and the signal with the lowest level has the longest duration, the remaining signals having durations and signal levels determined in a corresponding manner;

an electrically insulated current transformer at ground potential including at least one primary winding connected



to said auxiliary transformer secondary windings and further including at least one secondary winding for generating output signals representative of said disturbances;

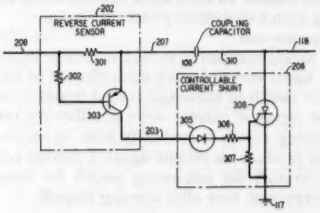
a sensing relay for each of said measuring stations being connected to the secondary winding of said current transformer, each relay having a respective tripping time whereby that sensing relay having the shortest tripping time is responsive to the output signal having the highest signal level, that sensing relay having the longest tripping time is responsive to the output signal having the lowest level, and the remaining sensing relays are responsive to respective other of said output signals in a corresponding manner.

4,090,227

TRANSIENT-PROTECTED SIGNAL DISTRIBUTION CIRCUIT

Joseph Gilbert Donald Schweitzer, Towaco, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 29, 1977, Ser. No. 782,348
Int. Cl.[2] H02H *9/02*
U.S. Cl. 361—57 **8 Claims**



1. In a signal distribution circuit having a tone signal source, a plurality of load circuits supplied by said source, a distribution transformer connected between said source and said load circuits and an amplifier coupling said source to said transformer, means for protecting said amplifier from transient surges caused by a fault in one or more load circuits comprising

an overload disconnecting device in tandem between each load circuit and said distribution transformer,

a switching device in shunt of the output of said amplifier, and

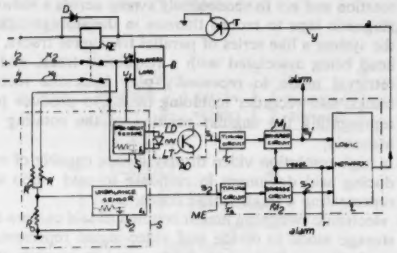
reverse current sensing means responsive to a surge current resulting from the commencement of operation of one or more of said disconnecting devices for triggering said switching device into its conductive state, said switching device being automatically returned to its nonconductive state upon completion of a disconnection operation.

4,090,228

PROTECTIVE DEVICE FOR A SYSTEM FEEDING A BALANCED LOAD FROM A REMOTE POWER SUPPLY

Elio Lupatin, Settimo Milanese (MI), Italy, assignor to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy

Filed Dec. 2, 1976, Ser. No. 747,049
Claims priority, application Italy, Dec. 3, 1975, 29942 A/75
Int. Cl.[2] H02H *3/24, 3/20*
U.S. Cl. 361—86 **12 Claims**



1. In a system for supplying power to a load from a remote source by way of a normally balanced transmission line having two conductors, the combination therewith of a protective device comprising:

first sensing means connected to said line for generating a first malfunction signal upon detecting a first trouble condition;

second sensing means connected to said liine for generating a second malfunction signal upon detecting a second trouble condition;

memory means operatively coupled to said sensing means for storing a malfunction signal from either of said sensing means independently of the continued existence of the trouble conditions giving rise thereto; and

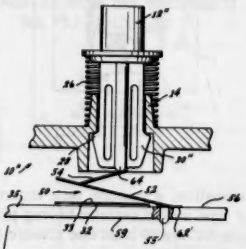
switch means controlled by said memory means for interrupting both said conductors in response to a stored malfunction signal, said memory means including a pair of binary storage circuits with setting inputs connected to said first and second sensing means, respectively.

4,090,229

CAPACITIVE KEY FOR KEYBOARD

J. Arthur Cencel, Newport Beach; Andrew Voge, Arcadia, and Barry W. Mullins, Glendora, all of Calif., assignors to Becton, Dickinson Electronics Company, Rutherford, N.J.

Filed Sep. 30, 1976, Ser. No. 728,070
Int. Cl.[2] H01G *5/16, 5/18*
U.S. Cl. 361—288 **4 Claims**



3. An elastically deformable substantially triplanar monolithic sheet having an area of electrically conductive material adapted for a charge retaining capacitive interaction with a stationary capacitor plate of substantially equal surface area to said sheet conductive material, said sheet comprising a plurality of integral portions, including:

a first portion having a substantial planar surface area;

a pair of resilient narrow, elongated leaf spring portions a first end of each which merges into said first portion, said leaf spring portions extending along part of the edge of said first portion, but spaced from it a planar end edge portion extending from said leaf portions, the plane of said end edge portion portion intersecting the plane normally encompassing said first portion; and

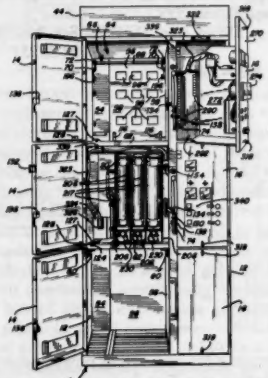
a tab-like overtravel spring portion cut and thus separated from said first portion on all sides of said overtravel spring portion save one, with said overtravel spring portion integrally and resiliently connected to said first portion to form a substantially planar portion whose plane normally intersects the plane of said first portion, said overtravel spring portion being adapted to be resiliently depressed into the plane normally encompassing said first portion to provide said area of electrically conductive material.

4,090,230

HIGH VOLTAGE MOTOR STARTER ENCLOSURE

Frederick B. Fuller; Miklos J. Orosz; Richard H. Williams, Jr., all of Columbia, and Glen F. Diimmler, Irmo, all of S.C., assignors to Square D Company, Park Ridge, Ill.

Filed Feb. 10, 1977, Ser. No. 767,278
Int. Cl.[2] H02B *1/14*
U.S. Cl. 361—345 **9 Claims**



1. A high voltage motor starter enclosure comprising:

a floor mounted vertical section comprising three starter cells, stacked one on top of the other, each cell suitable for mounting components of one motor starter, each starter cell comprising four distinct, isolated compartments, a line and vertical bus compartment, a load compartment, a low voltage control compartment having a drawout, swing-open door to provide easy access to starter components mounted therein, and a high voltage contactor compartment having a hinged door to provide easy access to a removable high voltage contactor mounted therein, each starter cell having both mechanical and electrical interlocks to minimize electrical hazards;

a plurality of removable cover barriers located within the high voltage compartment to provide front accessibility to the line and vertical bus and load compartments and to the components mounted therein;

a connection box having both line and load terminal connections, said box mounted within the line and bus compartment;

a shutter plate assembly isolating the line and load connections from the high voltage compartment;

a removable cell tray mounted in the high voltage compartment of each cell to define a floor isolating the high voltage compartments in each cell from one another, said tray having a guide means mounted thereon for slidably receiving the contactor, a shutter operator mechanism for opening and closing a shutter plate of the shutter plate assembly, a positive ground connection assembly, said contactor having a grounding means positively engaging said ground assembly in all contactor positions on said guide means;

a contactor stop assembly engaging said contactor grounding means to prevent withdrawal of the contactor from said guide means, said contactor further including an operator means for actuating the shutter mechanism; and

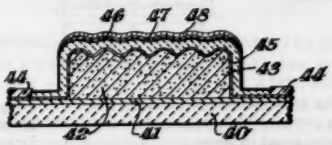
a shutter and contactor interlock mechanism mounted integrally with the shutter mechanism and further including an actuator means operatively responsive to the position of the hinged door on the high voltage compartment for locking out the contactor from an energized position when the door is open.

4,090,231

SCREEN PRINTED SOLID ELECTROLYTIC CAPACITOR

Richard J. Millard, Kennebunk, and David R. Poat, Wells, both of Me., assignors to Sprague Electric Company, North Adams, Mass.

Division of Ser. No. 376,499, Jul. 5, 1973, Pat. No. 3,889,357. This application Nov. 22, 1974, Ser. No. 526,184
Int. Cl.[2] H01G *9/00*
U.S. Cl. 361—433 **16 Claims**



1. A solid electrolytic capacitor comprised of:

(a) a substrate having at least one face made of a valve metal, said valve metal face serving as the anode connection of said capacitor;

(b) a porous pad of said valve metal being sinter bonded to said valve metal face, said pad having a rough outer surface, said roughness having the pattern of a screen;

(c) a valve metal oxide film formed over the exposed surfaces of said valve metal face and said valve metal pad;

(d) a solid manganese dioxide electrolyte permeating said porous valve metal pad and in contact with said valve metal oxide film; and

(e) a counterelectrode over said manganese dioxide electrolyte, said counterelectrode serving as the cathode connection of said capacitor.

4,090,232

ILLUMINATION MEANS FOR THE HEAD

Douglas Golden, Rte. 2 Box 217, Bono, Ark. 72416

Filed Aug. 24, 1977, Ser. No. 827,317
Int. Cl.[2] F21L *15/14*
U.S. Cl. 362—106 **9 Claims**

1. Illumination means for being worn about a person's head to direct a beam of light in the direction the person is looking, said illumination means comprising:

(a) a source of electric power;

(b) an electric light bulb;

(c) circuit means for electrically coupling said source of electric power and said light bulb, said circuit means including adjustment means for varying the amount of electric power passing from said source of electric power to said light bulb to thereby vary the brightness of said light bulb; and

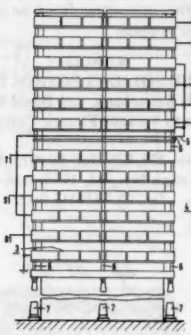
(d) attachment means for attaching said source of electric power and said light bulb to a person's head; said source of electric power, said light bulb, and said circuit means being mounted on said attachment means and being arranged on said attachment means in such a manner so as to substantially evenly distribute the weight thereof over the person's head.

4,090,233

SPATIAL ARRANGEMENT OF THE VALVES OF A THREE-PULSE CONVERTER SYSTEM

Gerd Thiele, and Manfred Schraudolph, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 5, 1976, Ser. No. 711,888
Claims priority, application Germany, Aug. 25, 1975, 2537780
Int. Cl.[2] H02M 7/00
U.S. Cl. 363—68 **3 Claims**



1. An arrangement comprising:

first and second three phase converter bridges adapted to be connected to respective converter transformers

the first bridge including valves which are arranged successively and separately as to phase and all of which are further arranged so as to lie one on top of the other to form a first tower-like structure;

the second bridge including valves arranged successively and separately as to phase and all of which are further arranged so as to lie one on top of the other to form a second tower-like structure;

the first tower-like structure being arranged on top of the second tower-like structure to form a single tower-like assembly;

the first bridge having DC and AC terminals arranged on one side of said assembly;

the second bridge having DC and AC terminals arranged on the other side of said assembly; and

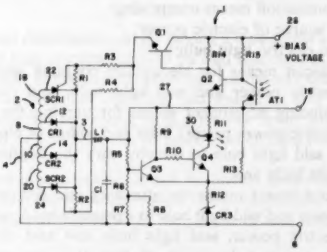
a DC line connecting the DC terminals of said first and second bridges.

4,090,234

INPUT TAP CHANGER

Meade Goodman Bierly, Elizabethtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 12, 1976, Ser. No. 731,262
Int. Cl.[2] H02M 7/155
U.S. Cl. 363—88 **4 Claims**



1. A voltage controlling circuit, comprising:

a transformer secondary winding provided with a first diode tap and a reference tap connected to corresponding output terminals across which is produced a first output voltage,

a normally conducting SCR tap on said winding on a location remote from said diode tap,

a gate of said SCR connected to a source of DC bias voltage through a switch means,

a base electrode of said SCR coupled to the same one of said output terminals as said diode tap,

voltage sampling means across said output terminals for sampling output voltage, and

coupling means connecting said sampling means with said switch means and being responsive to a change in output voltage to close said switch means and supply said bias voltage to said gate rendering said SCR conductive thereby changing the secondary winding effective tap from said diode tap to said SCR tap,

said voltage sampling means including a Schmidtt trigger having a Zener diode and a hysteresis resistor in series with each other,

said coupling means including a photo diode connecting said Schmidtt trigger with one of said output terminals, and

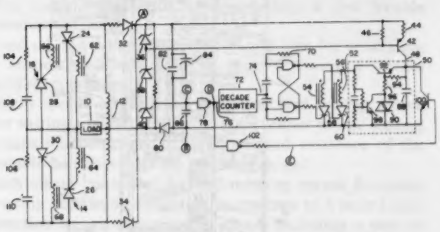
a photo conducting transistor coupling said switch means and one of said output terminals, said photo conducting transistor being optically coupled to said photo diode.

4,090,235

POWER FREQUENCY CONVERTER

William B. Mason, Arlington, Tex., assignor to Tecor Electronics, Inc., Euless, Tex.

Filed Aug. 11, 1976, Ser. No. 713,403
Int. Cl.[2] H02M 5/257
U.S. Cl. 363—160 **8 Claims**



1. Circuitry for converting power generated across a magneto winding at a first frequency to power at a second frequency, said magneto winding having a first terminal at one end thereof, a second terminal at the other end thereof and a center tap terminal, said first frequency being an integral multiple of said second frequency, said circuitry comprising:

first full wave rectifier means connected across said first and second terminals in a first polarity direction and operative responsive to an enabling signal applied thereto;

second full wave rectifier means connected across said first and second terminals in a second polarity direction opposite from said first polarity direction and operative responsive to said enabling signal applied thereto;

means for connecting a load at one end to said center tap winding and at the other end to said first and second full wave rectifier means;

means responsive to the waveform generated across said winding to derive a rectified and regulated voltage therefrom;

means responsive to said rectified and regulated voltage for detecting zero crossings of the waveform generated across said magneto winding and providing a zero crossing signal indicative thereof;

counting means responsive to said zero crossing signal for counting said zero crossings and providing an output signal whenever the count reaches said integral multiple;

means generating said enabling signal;

means for synchronizing said enabling signal with the waveform generated across said magneto winding at said first frequency; and

steering means responsive to said output signal for steering

said enabling signal alternately to said first and second full wave rectifier means.

4,090,236

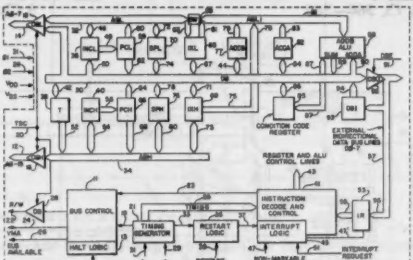
N-CHANNEL FIELD EFFECT TRANSISTOR INTEGRATED CIRCUIT MICROPROCESSOR REQUIRING ONLY ONE EXTERNAL POWER SUPPLY

Thomas H. Bennett; Earl F. Carlow, both of Scottsdale, and Anthony E. Kouvoussis, Phoenix, all of Ariz., Rodney H. Orgill; Charles Peddle, both of Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 519,150, Oct. 30, 1974, abandoned. This application Jun. 4, 1976, Ser. No. 693,061

Int. Cl.[2] G06F *3/00*

U.S. Cl. 364—200 **8 Claims**



1. An integrated circuit processing device having circuitry for operating at high speeds while executing each of a plurality of instructions stored at address locations in a memory and for electrical connection to a single source of electrical power which supplies only a first voltage and a second voltage to operate said processing device, said device comprising:

a. bus means for conducting digital information for use in the operation of said processing device in accordance with the execution of an instruction, said bus means having a plurality of conductors in parallel circuit arrangement for conducting substantially simultaneously a plurality of bits of digital information and thereby contributing to said high speed operation;

b. a plurality of groups of N-channel field effect transistors having characteristics which contribute to said high speed operation included in said processing device circuitry which also includes said plurality of conductors in parallel circuit arrangement;

c. control circuitry including one of said transistor groups, said control circuitry providing electrical signals which control the operation of said processing device in accordance with the execution of said instructions;

d. an arithmetic logic unit including another of said transistor groups, said arithmetic logic unit being responsive to said control circuitry and electrically coupled to said bus means for performing computations in accordance with the execution of said instructions;

e. a plurality of registers including a further one of said transistor groups, said registers being responsive to said control circuitry and electrically coupled to said bus means for storing information in accordance with the execution of said instructions;

f. address circuitry including a still further one of said transistor groups, said address circuitry being responsive to said control circuitry and electrically coupled to said bus means for providing address information representative of said address locations in said memory in accordance with the execution of said instructions; and

g. electrical means coupled to said control circuitry, to said arithmetic logic unit, to said plurality of registers and to said address circuitry for receiving electrical power from said single source of electrical power and operating said processing device to effect the execution of said instructions, said electrical means including two terminals for respectively receiving said first voltage and said second voltage wherein one of said first and second voltages differs from the other by substantially 5 volts.

4,090,237

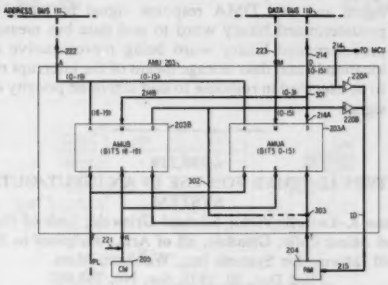
PROCESSOR CIRCUIT

James Owen Dimmick, Boulder, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 3, 1976, Ser. No. 720,417

Int. Cl.[2] G06F *9/20*

U.S. Cl. 364—200 **27 Claims**



1. In a processor, a first arithmetic unit (AMU) for receiving *m*-bit words, a second AMU for receiving *n*-bit data, means for entering a first *m*-bit word into said first AMU, means for transferring *n* bits from *n* predetermined bit positions of said first word from said first AMU to said second AMU, means for entering a second *m*-bit word into said first AMU, and means for subsequently reading out concurrently said *n* bits from said second AMU and said second *m*-bit word from said first AMU to form an $m+n$ bit word.

4,090,238

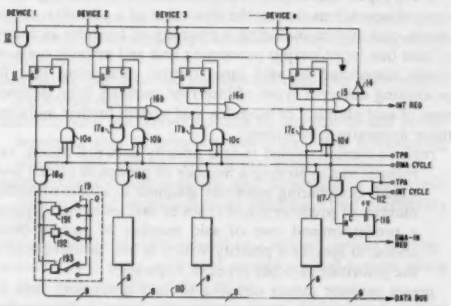
PRIORITY VECTORED INTERRUPT USING DIRECT MEMORY ACCESS

Paul Michael Russo, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,348

Int. Cl.[2] G06F *9/18, 13/00*

U.S. Cl. 364—200 **5 Claims**



1. In a computer system operating in cycles having data bus means, data storage means, direct memory access means including means for producing a DMA response signal for indicating that a DMA cycle is active, interrupt means including interrupt request means for initiating one of a plurality of interrupt routines, each of said routines stored at a different location in said data storage means, and means for producing interrupt response signals for indicating that an interrupt routine is initiated, and a plurality of peripheral device means capable of asynchronous operation for communicating with the computer system, each peripheral device means producing a service request signal, the improvement comprising:

a plurality of latching means, each responsive to a separate one of said service request signals, for storing said signal;

gating means responsive to said plurality of latching means for applying a signal to said interrupt request means;

means responsive to said interrupt response signals for initiating a direct memory access cycle;

priority means responsive to said plurality of latching means for activating one of a plurality of priority output signals indicative of the priority of the device corresponding thereto; and,

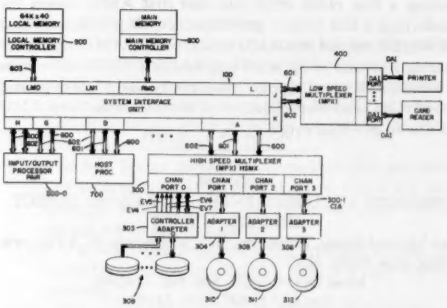
output means responsive to the activated priority output signal and said DMA response signal for supplying a predetermined binary word to said data bus means, said predetermined binary word being representative of the location in said data storage means of the interrupt routine to be executed in response to said activated priority output signal.

4,090,239

INTERVAL TIMER FOR USE IN AN INPUT/OUTPUT SYSTEM

Jerome J. Twibell; Victor Michael Griswold, both of Phoenix, and Jaime Calle, Glendale, all of Ariz., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Dec. 30, 1976, Ser. No. 755,907
Int. Cl.[2] G06F *9/18*
U.S. Cl. 364—200 **31 Claims**



1. An input/output processing system for controlling input-/output operations during the execution of a plurality of processes, said system including a plurality of modules including at least one input/output processing unit and priority network means connected to said input/output processing unit for processing different types of interrupt requests from different ones of said plurality of modules, said system further including timer apparatus comprising:

register means coupled to said priority network means, said register means storing a number of groups of coded level signals designating priorities assigned to a corresponding number of predetermined types of said interrupt requests, a predetermined one of said number of groups being coded to specify a priority which is low as compared to the priorities of other types of requests;

preset register means coupled to said processing unit for receiving signals corresponding to a count defining a time interval;

an interval counter connected to said preset register means for receiving said count, said interval counter in response to clocking signals generating an output signal indicating each completion of said timer interval;

a rollover counter connected to said interval counter, said rollover counter in response to said output signal storing a count indicating the total number of completed intervals counted by said interval counter; and,

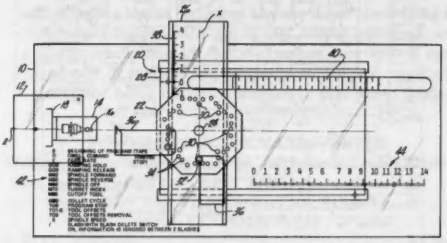
interrupt request means connected to said interval counter, said interrupt request means in response to each said output signal generating a predetermined type of interrupt request having said low priority, each said request output signal conditioning said interval counter to receive said count from said preset register for counting another time interval and conditioning said rollover counter to advance said count by one enabling said processing unit to expend a minimum of processing time in processing timer requests.

4,090,240

METHOD AND AID FOR PREPARING NC CONTROL PROGRAMS FOR MACHINE TOOLS

Vernon F. Blanchard, 35406 Brookview, Livonia, Mich. 48152

Filed Jun. 16, 1976, Ser. No. 696,858
Int. Cl.[2] G06G *1/00*
U.S. Cl. 364—300 **5 Claims**



1. A programming aid for use in preparing a control program for a numerically controlled machine tool for machining a workpiece, said machine tool including means for relatively moving and positioning a tool support and a workpiece supported therein under numerical control and further including automatic tool changing means for positioning and relatively moving a successive plurality of tools and holders on said support, the aid comprising:

a model of said workpiece;

a model of said machine tool, said model including a model of said tool support and models of said plurality of tools and holders and also including means mounting said models for relative moving and positioning thereof corresponding to said automatic tool changing and machining operations of said machine tool, said models being correspondingly scaled to each other in size and position, said model further including scales affixed along the axis of motion providing a measurement of said relative movements of said model of said workpiece and said model of said tool support corresponding to machining operations of said machine tool, whereby said model provides position information as an aid in preparing said control program.

4,090,241

METHOD FOR ESTIMATING AND CONTROLLING THE MASS FLOW RATE OF A FREE FALLING FLUID STREAM

Robert L. Houston, Heath, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Dec. 15, 1975, Ser. No. 640,357
Int. Cl.[2] G06F *15/46*
U.S. Cl. 364—473 **15 Claims**

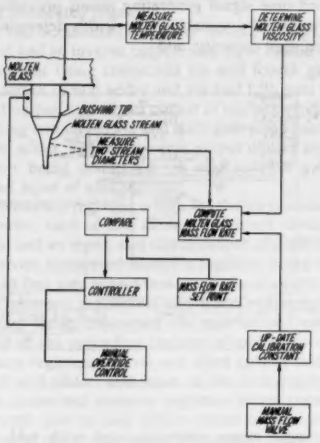
1. Apparatus for controlling the mass flow rate of a stream of molten glass having a substantially circular cross-section comprising:

(a) means for measuring the viscosity of said molten glass;

(b) means for measuring the diameter of said stream at at least two axially-spaced loci on said stream;

(c) means for determining the mass flow rate of said stream

from the measured viscosity and the measured diameters; and,



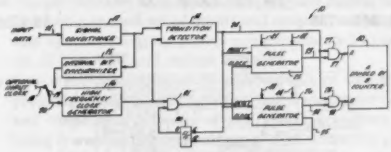
(d) means for adjusting the mass flow rate of said streams responsive to the determined mass flow rate.

4,090,242

METHOD AND MEANS FOR EVALUATING PHASE ENCODED COMMUNICATION SYSTEMS

Jesse P. Lerma, La Habra, and Charles A. Lindquist, Whittier, both of Calif., assignors to Odetics, Inc., Anaheim, Calif.

Filed Jul. 15, 1976, Ser. No. 705,699
Int. Cl.[2] G04F *10/04;* **H04B** *1/16;* **G06M** *11/00*
U.S. Cl. 364—514 **12 Claims**



4. In a system wherein transitions occur in a data signal encoded with a known format and transition displacements occur as a result of bandwidth limitations, noise, and the like, the improvement comprising:

means responsive to transitions of said data signal for determining the frequency of occurrence of subsequent transitions of said data signal within a first given time interval;

means responsive to transitions of said data signal for determining the frequency of occurrence of subsequent transitions of said data signal within a second given time interval, said second time interval being substantially greater than and including said first time interval; and

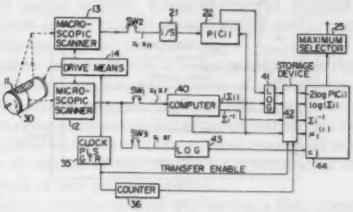
means for dividing the frequency of occurrence of transitions of said data signal within said first time interval by the frequency of occurrence of transitions of said data signal within said second time interval to determine the average frequency of occurrence of transitions of said data signal within said first time interval.

4,090,243

COLOR SEPARATING METHOD AND APPARATUS USING STATISTICAL TECHNIQUES

Hiroaki Kotera; Heijiro Hayami; Hiroyoshi Tsuchiya; Ryuzo Kan; Kunio Yoshida; Tsutomu Shibata, and Yukifumi Tsuda, all of Kawasaki, Japan, assignors to Matsushita Electric Industrial Company, Limited, Japan

Filed May 6, 1976, Ser. No. 683,657
Claims priority, application Japan, May 8, 1975, 50-55829
Int. Cl.[2] G01V *7/06;* **G01J** *3/46*
U.S. Cl. 364—526 **22 Claims**



18. A method for analyzing a print painted with n different colors C_i to form a colored pattern, where i ranges from unity to n, wherein each of the areas painted with a same color has a particular intensity distribution in the color spectrum with a tendency to vary as random variables from a distribution of mean values in accordance with a predetermined conditional probability density function $p(x|C_i)$ where x represents the spectral intensity of an elemental area, and each of the painted areas of the same color has a probability of occurrence $P(C_i)$ in said print, comprising:

placing said print with respect to a first optical system;

collecting spectral information from a predetermined area within said print with said optical system;

selectively filtering said collected spectral information to produce macroscopic spectral data of said predetermined area;

converting said macroscopic spectral data into macroscopic electronic data;

demultiplying the converted data by the size of said predetermined area to produce electronic data representing spectral data per unit area of said predetermined area;

mathematically manipulating said demultiplied electronic data and said mean values to determine said probability $P(C_i)$;

placing said print with respect to a second optical system;

scanning said print with said second optical system along each of a plurality of line paths;

selectively filtering the output from said second optical system to produce microscopic spectral data representing said spectral intensity x;

converting said microscopic spectral data x into microscopic electronic data x;

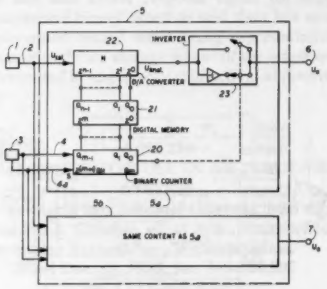
mathematically manipulating said conditional probability density function $p(x|C_i)$ with said converted electronic data x to determine the conditional probabilities of said electronic data x given that said data x belong to a said C_i and manipulating said probability $P(C_i)$ with said conditional probabilities to produce a set of products of said probability and said conditional probability; and

detecting a C_i which maximizes said products.

4,090,244
METHOD AND CIRCUIT ARRANGEMENT FOR DETERMINING THE VECTOR COMPONENTS OF AN OSCILLATION

Michael Altwein, Darmstadt, Germany, assignor to Firma Carl Schenck AG, Darmstadt, Germany

Filed Mar. 4, 1977, Ser. No. 774,643
Claims priority, application Germany, Mar. 23, 1976, 2612238
Int. Cl.[2] G06J *1/00*; G06G *7/22*; G01M *1/22*
U.S. Cl. 364—603 **10 Claims**



1. A circuit arrangement for extracting required analog output signals from an analog oscillatory input signal to determine the vector components of said input signal which includes a mixture of interfering signals having different frequencies and amplitudes, comprising a first source for supplying said analog input signals, and a second source for supplying digital reference signal, a multiplying digital-to-analog converter having a plurality of digital input means and analog input means, as well as output means, said first source of analog input signals being connected to said analog input means of said D/A converter, said circuit arrangement further comprising digital memory means having addressing inputs and control outputs and binary counter means having input means connected to said second source for supplying said digital reference signals to said binary counter means, said binary counter means having output means connected to said addressing inputs of said digital memory means, said control outputs of said digital memory means being connected to said digital input means of said D/A converter, whereby a multiplying signal combination is provided in said D/A converter in response to the addressing and stepping of said digital memory by said binary counter in response to said digital reference signals.

4,090,245
EFFECTIVE DIGIT CAPACITY MODIFICATION MEANS FOR INTEGRATED CIRCUIT CALCULATORS

Iwao Hamasaki, Miyazaki, and Koji Maekawa, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 28, 1976, Ser. No. 709,374
Claims priority, application Japan, Jul. 31, 1975, 50-94343
Int. Cl.[2] G06F *1/00*
U.S. Cl. 364—712 **6 Claims**

1. An integrated circuit comprising:

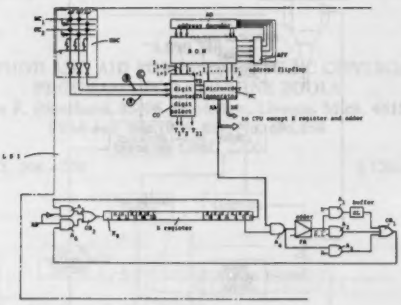
a numerical register for storage of numeral information;

means for generating word time signals designating the effective digit capacity of the register in response to predetermined digit capacity codes; and

an external terminal means provided on said integrated circuit for receiving external signals determinative of a given digit capacity;

digit capacity code generating means interconnected between said terminal and said word time signal generator for encoding said external signals into said predetermined digit capacity codes and applying said codes to said word time signal generating means;

said word time signal generating means providing a word time signal of a variable pulse width determinative of a desired digit capacity; and

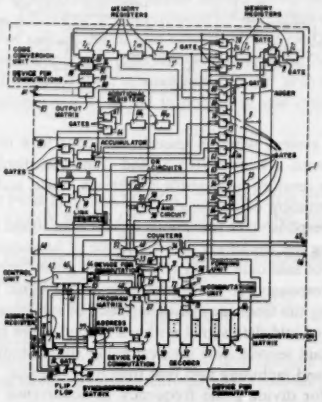


control logic means interconnected with said numerical register and said word time generator and responsive to said variable pulse width word time signal to vary the digit capacity of said register.

4,090,246
SEQUENTIAL COMPUTING SYSTEM

Jury Mikhailovich Polsky, ulitsa Postysheva, 16, kv. 26; Valentin Petrovich Zakharov, ulitsa Anri Barbjussa, 22-26, kv. 78; Nikolai Trofimovich Golets, ulitsa Malinovskogo, 25"g", kv. 79; Jury Vasilievich Tayakin, ulitsa Scherbakova, 98"v", kv. 109; Gennady Petrovich Lipovetsky, ulitsa Scherbakova, 82"g", kv. 13; Valery Vasilievich Protsenko, ulitsa Scherbakova, 98"b", kv. 66; Alexandr Dmitrievich Khomenko, ulitsa Vernadskogo, 73, kv. 4"a"; Vladimir Pavlovich Sidorenko, ulitsa Scherbakova, 92"v", kv. 29; Alexandr Yakovlevich Sirota, ulitsa Scherbakova, 74"b", kv. 81; Jury Vladimirovich Prokofiev, ulitsa Scherbakova, 73, kv. 131, and Alexandr Maximovich Kopytov, ulitsa Karpinskogo, 3, all of Kiev, U.S.S.R.

Filed Jun. 1, 1976, Ser. No. 691,601
Int. Cl.[2] G06F *7/38*
U.S. Cl. 364—736 **18 Claims**



1. A sequential computing system consisting of at least one sequential computer which comprises:

an adder for information processing having a first, a second and a third input, and a first and a second output;

a first, a second, a third, a fourth, a fifth, a sixth, a seventh, an eighth, a ninth, a tenth, an eleventh and a twelfth gate, each of which has a control input, said control inputs being connected together;

at least one accumulator register having an input, a direct output and an inverse output, said input of said accumulator register being connected via said fourth gate to said first output of said adder and via said fifth gate to its own direct output, said direct output of said accumulator register being connected via said sixth gate to said second input of said adder, and said inverse output of said accumulator register being connected via said seventh gate to said second input of said adder;

series connected registers which are the main memory of the computer, each of said memory registers having a direct output and an input, said direct output of a last in order of said series connected memory registers being connected via said first gate to said first input of said adder, said input of at least one register of said series connected memory registers being connected via said second gate to said output of the preceding register of said series connected memory registers and via said third gate to said first output of said adder, said input of the first register of said series connected memory registers being connected via said tenth gate to said direct output of the last in order register of said series connected memory registers, via said eleventh gate to said direct output of said accumulator register, and via said twelfth gate to said output of at least one more of said series connected memory registers;

at least one single digit Link register for carry storage having an input, a direct output and an inverse output, said input of said Link register being connected via said eighth gate to its own direct output and via said ninth gate to said second output of said adder;

a program matrix having inputs and outputs;

a device for commutation of input signals of said program matrix having inputs and outputs, said inputs of said program matrix being connected to said outputs of said device for commutation of input signals of said program matrix;

a device for commutation of output signals of said program matrix having inputs, a first set, a second set, a third set and a fourth set of outputs, and an output, said outputs of said program matrix being connected to said inputs of said device for commutation of output signals of said program matrix;

a synchroprogram matrix having inputs and outputs;

an output decoder of said synchroprogram matrix having a first and a second set of inputs and outputs, said outputs of said synchroprogram matrix being connected to said first set of inputs of said output decoder;

a device for commutation of input signals of said synchroprogram matrix having a first set and a second set of inputs and outputs, said inputs of said synchroprogram matrix being connected to said outputs of said device for commutation of input signals of said synchroprogram matrix, said first set of inputs of said device for commutation of input signals of said synchroprogram matrix being connected to said third set of outputs of said device for commutation of output signals of said program matrix;

a microinstruction matrix to control said gates having inputs and outputs, said outputs being connected to said control inputs of each of said gates;

a device for commutation of input signals of said microinstruction matrix having inputs and outputs, said inputs of said device for commutation of input signals of said microinstruction matrix being connected to said outputs of said output decoder, said outputs of said device for commutation of input signals of said microinstruction matrix being connected to said inputs of said microinstruction matrix;

a controlled synchronizer for double periodic synchronization having at least three series connected counters to initiate time separated clock signals, said first counter having an input, a set of outputs, a first and a second output, said second counter having an input, a set of outputs, a first and a second output, said third counter having an input, a first and a second set of outputs, and a first and a second output, said input of said first counter being connected to a synchronization input of said computer, said first set of outputs and said second output of said third counter being connected to synchronization outputs of said computer, said input of said second counter being connected to said second output of said first counter, said input of said third counter being connected to said second output of said second counter, and at least one control signal forming unit having inputs and outputs, said inputs of said control signal forming unit being connected to said second set of outputs of said third counter, the second set of inputs of said device for commutation of input signals of said synchroprogram matrix being connected to said set of outputs of said second counter, said second set of inputs of said output decoder being electrically coupled to said outputs of said control signal forming unit to provide for a sequence of microinstructions;

an address counter having a first, a second, and a third set of inputs, and outputs, said outputs of said address counter being connected to said inputs of said device for commutation of input signals of said program matrix, said first set of inputs of said address counter being connected to said first set of outputs of said device for commutation of output signals of said program matrix;

an address counter control unit having a first, a second and a third input, a set of inputs, a set of outputs, and a first and a second output, said second set of inputs of said address counter being connected to said set of outputs of said address counter control unit, said set of inputs of said address counter control unit being connected to said second set of outputs of said device for commutation of output signals of said program matrix, the second input of said address counter control unit being connected to said first output of said third counter, said first input of said address counter control unit being connected to said direct output of said single digit Link register.

4,090,247

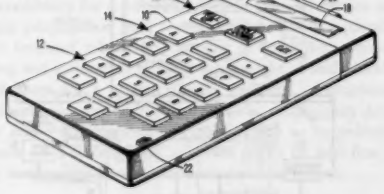
PORTABLE DATA ENTRY DEVICE

Peter G. Martin, Arlington, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.

Filed Aug. 11, 1975, Ser. No. 603,878

Int. Cl.[2] G06F *3/14, 3/04, 13/00*

U.S. Cl. 364—900 **29 Claims**



1. A portable data entry device comprising:

a housing of size and configuration for portable use;

a keyboard having a plurality of keys on said housing for the manual entry of numerical and code data;

control keys on said housing for the manual control of memory access;

a single electronic solid state serial shift register memory within said housing for containing a plurality of records, each record being composed of a plurality of multiple bit characters, said memory including input and output stages;

first circuit means within said housing directly interconnecting said keyboard and said single serial shift register mem-

ory and operative upon actuation of any key of said keyboard to enter corresponding numerical or code data directly into an intended record location of said memory;

second circuit means within said housing and operative upon manual actuation of said control keys for sequencing said memory to any intended record location for review and correction of data previously entered in any of said record locations;

display means on said housing for visual representation of numerical and code data entered by said keyboard into said memory;

connector means on said housing for direct electrical connection of said memory to a data utilization system for the transfer of data stored in said memory to said data utilization system;

a power source within said housing and operative to energize said device;

means operative to provide a signal indication of accessed memory locations; and

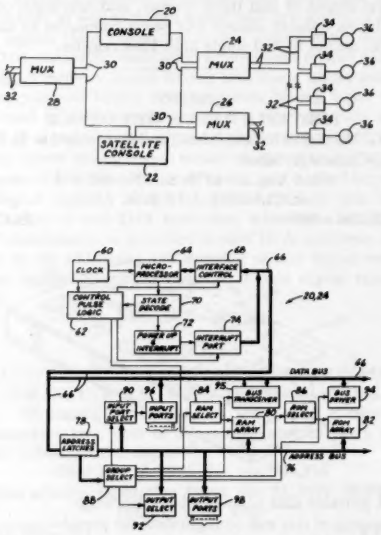
means operative in response to said signal indication for energizing said input and output stages only when a selected location of said memory is accessed for entering data, for readout of data, or for display, data stored in said memory being unaffected when said input and output stages are not energized.

4,090,248

SUPERVISORY AND CONTROL SYSTEM FOR ENVIRONMENTAL CONDITIONING EQUIPMENT

James R. Swanson, Glenview; Sam DiCesare, Wilmette, and Richard C. Barthel, Chicago, all of Ill., assignors to Powers Regulator Company, Skokie, Ill.

Filed Oct. 24, 1975, Ser. No. 625,649
Int. Cl.[2] G06F *3/04, 15/46;* **H04Q** *9/00, 11/00*
U.S. Cl. 364—900 **32 Claims**



1. A system for monitoring and controlling a plurality of field points associated with environmental and temperature control equipment in a building or the like, comprising:

two or more multiplexing modules for sequentially polling field point modules that are connected thereto by transmitting various unique address signals to field point modules operably connected therewith and receiving identification and status signals therefrom, each of said multiplexing modules selectively issuing command signals for operating and adjusting control equipment associated with a field point, each said multiplexing modules simultaneously and independently performing said polling, receiving and issuing operations with respect to the field point modules connected thereto;

each multiplexing module having one or more field point modules connected thereto, each of which receives said address signals and recognizes its unique address signals identifying the same, each field point module transmitting identification and status signals of an associated field point unit to its associated multiplexing module in response to receiving and recognizing its address signals, said field point modules also receiving and forwarding said command signals to certain associated field point units for commanding the environmental and temperature control equipment to carry out selected operations and adjustments;

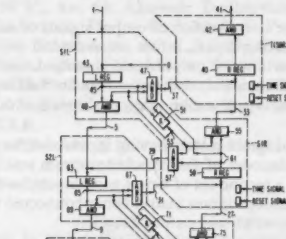
a field point unit operatively connected to each field point module, said field point unit producing electrical signals that are indicative of the status of a parameter relating to the environmental and temperature control equipment or an environmental and temperature condition, certain of said field point units being adapted to implement received command signals for effecting a control equipment adjustment and the like.

4,090,249

APPARATUS FOR SORTING RECORDS IN OVERLAP RELATION WITH RECORD LOADING AND EXTRACTION

Tien Chi Chen, San Jose; Chin Tung, Saratoga, and Vincent Y. Lum, Monte Sereno, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 26, 1976, Ser. No. 745,255
Int. Cl.[2] G06F *7/22;* **G11C** *19/00*
U.S. Cl. 364—900 **9 Claims**



6. An apparatus for sorting N plural bit records, each record having an identifier, the apparatus comprising:

an input and output terminal for serially accepting records into and discharging records from the apparatus;

2N registers, each register being adapted to store one record, 2N−2 of the registers being clustered as N−1 pairs;

N−1 comparison circuits, each circuit coupling a corresponding one of the register pairs for providing signals indicative of the relative magnitude difference of a first or second kind between the identifiers of the records contained in the register pair; and

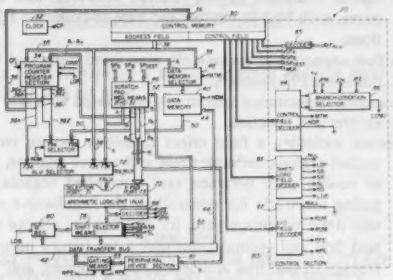
means for interconnecting registers to form a linked linear

array of the 2N registers, said means coupling the input terminal at one end of the linear array and the output terminal at the other end of the linear array, said means also including means for synchronously advancing by one register position along the array from the input to output terminals the record contents of those register pairs whose corresponding comparison circuits generate signals of the first kind, said means further including means for synchronously exchanging the record contents between the registers of each pair whose corresponding comparison circuit generates signals of the second kind, said exchanged records then being advanced by one register position along the linear array from the input to output terminals.

4,090,250
DIGITAL SIGNAL PROCESSOR

Curtis E. Carlson, Nashua, N.H.; Richard A. Johnson, Stow, and Edward E. Spignese, Marblehead, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Sep. 30, 1976, Ser. No. 728,662
Int. Cl.² G06F *15/00, 15/50*
U.S. Cl. 364—900 **7 Claims**



1. In a digital processor having: a control memory for storing a plurality of control instructions, each one having an address field and a control field; a program counter section for addressing such control memory in accordance with the contents stored in such control memory section; a control section for developing control signals in response to the control field of the addressed one of the control instructions and to condition signals; a data transfer bus; an arithmetic unit means responsive to the control signals for processing data applied to a pair of input terminals of such arithmetic unit means, such data being processed selectively in accordance with such control signals; means for coupling such processed data to the data transfer bus; and means coupled to the output of the arithmetic unit for producing the condition signals in accordance with the data processed by the arithmetic unit means, the improvement comprising:

(a) a register means comprising:
  (i) a plurality of storage elements;
  (ii) input addressing means for enabling data on the data transfer bus to be stored into one of such storage elements selectively in accordance with the control signals;
  (iii) first output means for coupling data stored in any one of such storage elements to a first output terminal of such register means selectively in accordance with the control signals; and
  (iv) second output means for coupling data stored in any one of such storage elements to a second output terminal of such register means selectively in accordance with the control signal and wherein the first output terminal of the register means is coupled to one of the pair of input terminals of the arithmetic unit means;

(b) means for coupling data on the first output terminal of the register means to the program counter section;

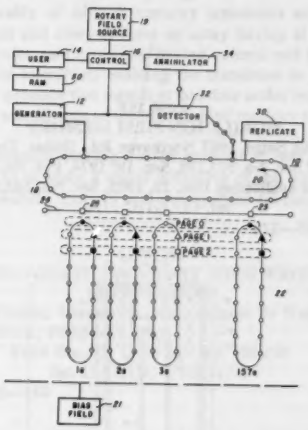
(c) selector means having one input terminal connected to the program counter section and a second input terminal connected to the second output terminal of the register means for coupling either the program counter section or the second output terminal of the register means to the second one of the pair of input terminals of the arithmetic unit means selectively in accordance with the control signals; and

(d) means, responsive to the control signals and the condition signals, for enabling the program counter section to store as the next address for the control memory either: (1) the prior contents stored in the program counter incremented or (2) an address comprising the address field of the currently addressed control instruction and the data on the first output terminal of the register means selectively in accordance with the condition signal.

4,090,251
BUBBLE MEMORY REDUNDANCY STORAGE

James Steven Flannigan, Houston; Dennie Joel Shadrick, Stafford, and Bennett Sanford Scott, Houston, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 9, 1977, Ser. No. 804,979
Int. Cl.² G11C *19/08*
U.S. Cl. 365—1 **8 Claims**



6. A method of accessing on-chip redundancy data to insure data credibility for a magnetic domain memory device having a major propagation path operably aligned with a plurality of minor loops of which at least one is defective, comprising: reading and evaluating the first three pages of said plurality of minor loops for a predetermined sequence of magnetic domains and voids, and signaling a user that redundancy data is in order while regenerating any page found to be defective in response to a finding that any two pages of said first three pages correspond in the information stored therein.

4,090,252
ROTATIONAL FIELD GENERATOR FOR BUBBLE MEMORY PACKAGE

Roland Joseph Braun, Vestal, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 13, 1976, Ser. No. 731,607
Int. Cl.² G11C *19/08*
U.S. Cl. 365—2 **7 Claims**

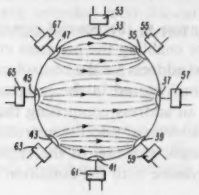
1. A modular subassembly for field accessed bubble memory devices, comprising:

at least one level of bubble memory devices;

at least one solid disk having a plurality of contact points positioned on its circumference;

means for positioning and supporting said bubble memory devices proximate said conductive disk; and

current switching means operative to sequentially establish



electrical currents between selected pairs of said contact points to thereby effect a rotational magnetic field through said bubble memory devices operative to propogate magnetic bubble domains in said devices.

4,090,253

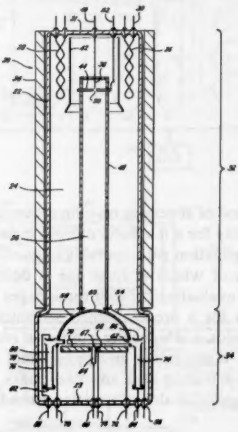
MOBILE ION FILM MEMORY

Francis John Salgo, 5907 Northaven Rd., Dallas, Tex. 75230

Division of Ser. No. 507,278, Sep. 19, 1974, Pat. No. 3,936,690. This application Dec. 22, 1975, Ser. No. 643,546

Int. Cl.² G11C *11/42*

U.S. Cl. 365—128 **3 Claims**



1. A method of storing data in a Langmuir film deposited on a conducting substrate, said film containing an excess of positive ions, comprising the steps of:

bombarding a surface of said film at an address on said surface where a data bit is to be stored with a low intensity electron beam;

applying simultaneously with said bombardment of said address a potential to said substrate adapted to generate a gradiant sufficient to mobilize said ions towards the surface of said film; and

removing said potential and said bombardment when said ions are proximate said surface.

4,090,254

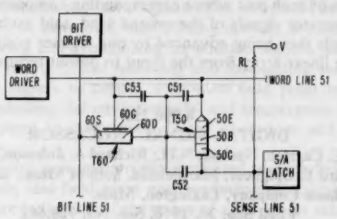
CHARGE INJECTOR TRANSISTOR MEMORY

Irving Tze Ho, and Jacob Riseman, both of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 1, 1976, Ser. No. 662,492

Int. Cl.² G11C *11/24, 11/40*

U.S. Cl. 365—150 **22 Claims**



1. A semiconductor transistor memory cell comprising:

a bipolar transistor having emitter, collector, and base regions, with base to emitter and base to collector PN junctions;

a first capacitance operatively associated with said base to collector PN junction;

a second capacitance operatively associated with said base to emitter PN junction;

means including a field effect transistor having two controlled regions defining drain and source regions, a drain to source path between said controlled regions and a gating electrode for controlling the conductive state of said drain to source path, for altering the charge state of said first and second capacitance for binary information storage in said first and second capacitances; and

sensing means for sensing the stored binary information;

said gating electrode and emitter region being electrically connected to each other.

4,090,255

CIRCUIT ARRANGEMENT FOR OPERATING A SEMICONDUCTOR MEMORY SYSTEM

Horst H. Berger, Sindelfingen; Klaus Heuber, Boeblingen; Wilfried Klein, Holzgerlingen; Knut Najmann, Gaertringen, and Siegfried Wiedmann, Stuttgart, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 1, 1976, Ser. No. 662,309

Claims priority, application Germany, Mar. 15, 1975, 2511518

Int. Cl.² G11C *11/40, 7/00*

U.S. Cl. 365—154 **9 Claims**

1. A memory circuit comprising:

a word line,

a pair of bit lines,

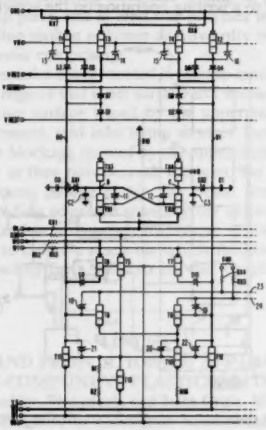
a cross coupled bipolar memory cell coupled between the bit lines and having its collector emitter circuits coupled to the word line,

means coupled to the word line for selectively setting the word line at first and second voltage levels, said second voltage level being at a magnitude lower than said first voltage level,

a pair of current sources each being coupled between ground and a current sink through a first diode and a respective one of said bit lines through a second diode,

means for selectively decoupling said current sources from said current sink during the application of said second voltage level to said word line and selectively coupling said current sources to said bit lines to switch the current flowing through said current sources to said bit lines to

raise the voltage on said bit lines to a first selected voltage level, and



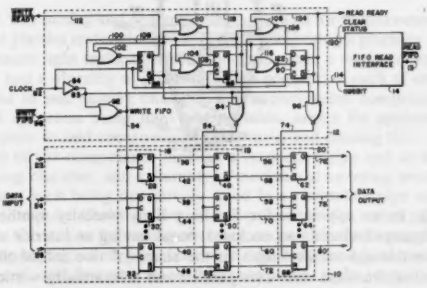
means for maintaining a second selected voltage level on each of said bit lines.

4,090,256

FIRST-IN-FIRST-OUT REGISTER IMPLEMENTED WITH SINGLE RANK STORAGE ELEMENTS

Edward C. Hepworth, Apache Junction, and Rodney J. Means, Tempe, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 27, 1975, Ser. No. 580,634
Int. Cl.² G11C *11/34*
U.S. Cl. 365—154 **8 Claims**



1. A first in-first out memory system including in combination:

a. storage array means comprising data registers formed of single rank storage elements for storing binary information;

b. status record means for recording whether each of said data registers is full or empty;

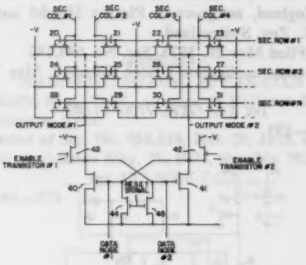
c. control logic means coupled to said status record means and to said storage array means for sequencing transfer of data within said storage array means, said transfer occurring only between adjacent data registers whose status record shows an empty data register preceded by full data register.

4,090,257

DUAL MODE MNOS MEMORY WITH PAIRED COLUMNS AND DIFFERENTIAL SENSE CIRCUIT

David W. Williams, Baltimore, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 28, 1976, Ser. No. 700,235
Int. Cl.² G11C *11/40*
U.S. Cl. 365—184 **12 Claims**



3. An MNOS memory comprising:

a. a plurality of MNOS memory transistors arranged in columns and rows to form an array having at least two data nodes, said array also having column and row select lines for selectively enabling the transistors in groups of two to produce two signals at said data nodes indicative of the threshold state of the two enabled memory transistors; and

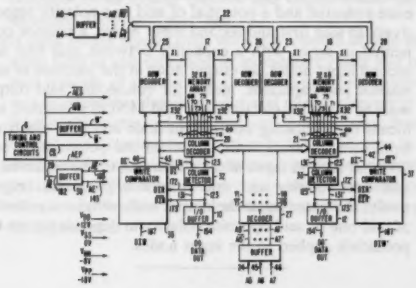
b. a differential sensing circuit coupled to said two data nodes to produce a signal indicative of the difference in the threshold states of said two enabled transistors.

4,090,258

MNOS NON-VOLATILE MEMORY WITH WRITE CYCLE SUPPRESSION

James R. Cricchi, Catonsville, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 29, 1976, Ser. No. 755,280
Int. Cl.² G11C *7/00, 11/40*
U.S. Cl. 365—184 **9 Claims**



1. A method for writing data into a semiconductor memory cell utilizing at least first and second variable threshold transistors comprising the steps of:

holding the input data to be written into a memory cell;

reading the data presently stored in said memory cell to provide read data;

comparing said input data with said read data to generate a first signal indicative of said input and read data being the same and a second signal indicative of said input and read data being different;

inhibiting the write cycle polarization voltages in response to said first signal; and

writing said input data into said memory cell in response to said second signal.

4,090,259

MEANS FOR CONTROLLING THE GATE POTENTIAL OF MNOS TRANSISTORS IN A MEMORY

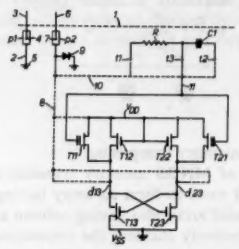
John David Wilcock, and John Flackett Dickson, both of Northampton, England, assignors to Plessey Handel und Investments A.G., Zug, Switzerland

Filed May 20, 1976, Ser. No. 688,182

Claims priority, application United Kingdom, May 20, 1975, 21367/75

Int. Cl.[2] **G11C** *7/00, 11/40*

U.S. Cl. 365—191 **9 Claims**



1. An electrical information storage device comprising:

(a) an integrated circuit chip comprising a substrate and electrical circuitry on the substrate, said electrical circuitry comprising metal-nitride-oxide-silicon (MNOS) transistors, means for applying a reference potential to said substrate, conductive pad means for applying potentials of one polarity relative to the reference potential to said electrical circuitry, said conductive pad means comprising a conductive pad, protective device means connected between said conductive pad and said substrate for becoming conductive if the conductive pad to which it is connected obtains a potential having a polarity opposite to said one polarity; and

(b) control means for controlling the potential at the gate electrodes of said MNOS transistors comprising, a first and a second input node, means for applying said reference potential and a potential of said one polarity respectively to said first and second input nodes, a resistor connected in series with a capacitor between said first and second input nodes, an output node at the junction of said resistor and capacitor, means for connecting said output node to said gate electrodes of said MNOS transistor, and means for insulating said output node and gate electrode from said substrate, wherein when the potential on said first and second input node is changed to the potential of said one polarity and said reference potential, respectively, the potential at the output node obtains a potential of said one or said opposite polarity in dependence on the potentials applied to the input nodes.

4,090,260

DIGITAL IMAGE MEMORY ADAPTED TO DISTRIBUTE IMAGE BLANKS

Dusan Sinobad, Orsay, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel S.A., Paris, France

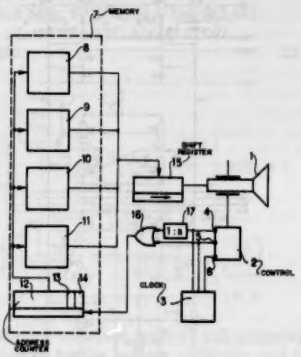
Filed Jun. 25, 1976, Ser. No. 699,964

Claims priority, application France, Jul. 1, 1975, 75 20678

Int. Cl.[2] **G11C** *8/00;* **H04N** *3/00*

U.S. Cl. 365—237 **2 Claims**

1. A digital memory for an image to be displayed by systematic point by point and line by line scanning of a television type screen, the memory being comprised of N blocks, each block containing data for the image, an address counter and a read out register connected to said memory, said address counter receiving clock pulses for synchronizing a read out operation of the memory to a writing operation on the screen, to thereby



extract display data successively from all the memory blocks, said address counter receiving an additional counting pulse every time a full line has been written on the screen, said blocks being read cyclically so that successive read out operations concern different blocks.

4,090,261

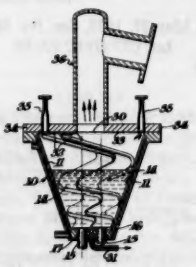
APPARATUS FOR FINISHING HIGH VISCOSITY SYNTHETIC POLYMERS

John Maurice Iwasyk, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 28, 1977, Ser. No. 791,940

Int. Cl.[2] **A21C** *1/02*

U.S. Cl. 366—83 **7 Claims**



1. In an apparatus for finishing high viscosity synthetic polymers including an enclosed vessel having an interior surface throughout its length in the shape of two intersecting conical frustums with axes parallel and substantially vertical, the base of the frustums being displaced upward with respect to the apexes, a vent in the upper portion of the vessel and a discharge in the lower portion of the vessel, two interengaging helical screw elements rotatably supported on shafts passing through seals in the base of the vessel, the screw elements when co-rotated conforming to the interior surface of the vessel such that the screw elements effect a complete wiping of the interior surface, and wherein the screw elements interengage uninterruptedly along their lengths such that each element effects a complete wiping of the adjacent element, the bottom portion of the screw elements forming a pressure generating zone and the top portion of the screw elements forming a mixing zone having a hollow center described by the co-rotating screw elements, the vessel having a top plate with a

flat inner surface, each screw element having an upper end with a substantially flat upper surface, these flat upper surfaces upon co-rotation effecting complete wiping of the inner surface of the top plate, and at least one polymer inlet in the top plate for feeding molten polymer downwardly into the vessel, the improvement comprising:

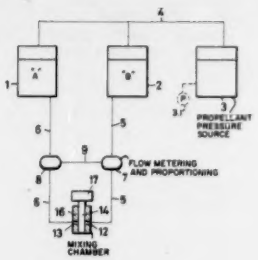
said polymer inlet being located in the top inner surface near an outer edge of said inner surface and within each portion of the inner surface wiped by the upper surface of each screw element, said inlet being sized or located to avoid complete blockage thereof by the upper ends of the screw elements as they pass beneath the inlet, the upper end of each element having a thin flat raised portion with an abrupt leading edge and spanning the entire width of the element end in a direction transverse to the direction of rotation to define a reservoir which facilitates collecting and spreading fresh polymer on the top plate inner surface.

4,090,262

MIXING AND PROPORTIONING APPARATUS FOR MULTI-COMPONENT PLASTICS MATERIALS

Fritz W. Schneider, Strasslach, and Ivica Grgic, Munich, both of Germany, assignors to Elastogran Maschinenbau GmbH & Co., Strasslach, Germany

Filed Jun. 11, 1976, Ser. No. 695,244
Claims priority, application Germany, Jun. 12, 1975, 2526215
Int. Cl.[2] B01F *15/04, 15/14*
U.S. Cl. 366—155 **2 Claims**



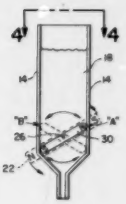
1. In a mixing and proportioning apparatus for multi-component plastics materials, said apparatus comprising a plurality of pressure tight tanks, one for each component, a mixing chamber and a plurality of pipes, one pipe connecting each of said tanks to said mixing chamber, the improvement comprising said apparatus being light and portable, means for applying pressure to said components in said tanks and causing flow of each of the components through a respective pipe and to the mixing chamber, and a plurality of mechanical metering mechanisms each being operatively fitted in a respective pipe and continuously allowing flow of component in the entire pipe from the tank to the mixing chamber, and each including a gear pump having a first gear wheel and a second gear wheel meshing with said first gear wheel, said gear pumps in the respective pipes continuously turning as motors under the influence of the flowing components and allowing flow of the components therethrough to continuously meter passage of the components, and said gear pumps also, while turning as motors, limiting rate of flow of the components therethrough, and shaft means positively mechanically coupling the first gear wheels of both of said gear pumps to each other to continuously proportion the flow of said components to the mixing chamber.

4,090,263

MAGNETIC MIXING APPARATUS

Jack L. Hoffa, Brea, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 554,024, Feb. 28, 1975, abandoned.
This application Mar. 29, 1977, Ser. No. 782,583
Int. Cl.[2] B01F *7/02*
U.S. Cl. 366—273 **4 Claims**



1. Mixing apparatus comprising:

a chamber for receiving materials to be mixed;

a magnetic mixing element positioned in the chamber and adapted to rotationally reciprocate about an axis of rotation;

limit means for limiting said rotational reciprocation of the mixing element to a fraction of a revolution between first and second limit positions of reciprocation and including first and second interior surfaces of the chamber spaced laterally from the axis of rotation of the mixing element to engage the mixing element in said limit positions;

magnetic means positioned outside of the chamber for producing a rotating magnetic field which is magnetically coupled to the mixing element and which rotates in one direction about said axis; and

said limit means cooperating with the rotation of said magnetic field in one direction to momentarily halt and redirect rotation of said mixing element at said limit positions and to establish a dwell time for said mixing element in the limit position attained after rotation of said mixing element in said one direction which exceeds the dwell time in the limit position attained after rotation in a direction opposite to said one direction thereby providing irregular rotational reciprocation of said mixing element between said limit positions.

DESIGN PATENTS

GRANTED MAY 16, 1978

ERRATA

For CLASS	See PATENT NO.
D27-051	247,921

DESIGNS

MAY 16, 1978

247,866

SLIDING DRAWER FOR ATTACHING TO BEDS

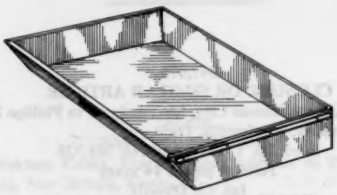
Antonio F. Sandoval, 323 Blackshear Ave., Los Angeles, Calif. 90022

Filed Oct. 6, 1975, Ser. No. 619,892

Term of patent 14 years

Int. Cl. D6—*06*

U.S. Cl. D6—191



247,867

TUMBLER OR SIMILAR ARTICLE

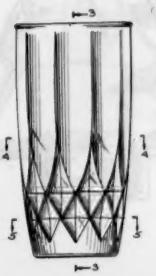
James Lloyd Thrush, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Nov. 24, 1976, Ser. No. 744,458

Term of patent 14 years

Int. Cl. D7—*01*

U.S. Cl. D7—14



247,868

FUNNEL

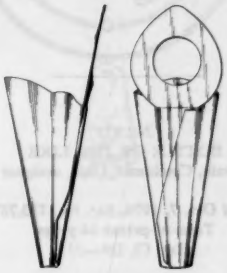
William J. Britt, Greenville, S.C., assignor to Morton-Norwich Products, Inc., Greenville, S.C.

Filed Jan. 7, 1976, Ser. No. 647,068

Term of patent 14 years

Int. Cl. D7—*99*

U.S. Cl. D7—68



247,869

MEASURING SPOON OR SIMILAR ARTICLE

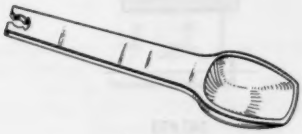
Edward N. Montesi, Barrington, R.I., assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Jun. 23, 1976, Ser. No. 698,974

Term of patent 14 years

Int. Cl. D7—*03*

U.S. Cl. D7—50



247,870

VEGETABLE PEELER

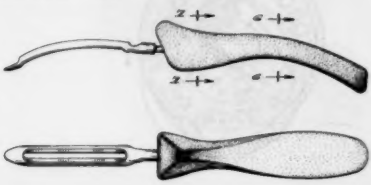
Vernon H. Herrmeyer, 719 N. 5th St., Sheboygan, Wis. 53081, and Jane H. Paulson, 4148 N. Newhall, Milwaukee, Wis. 53211

Filed Jun. 24, 1976, Ser. No. 699,465

Term of patent 14 years

Int. Cl. D7—*04*

U.S. Cl. D7—147

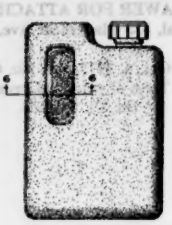


247,871
CAM FOR A FASTENING MECHANISM FOR CONTAINER DOORS
Leslie Ralph Shaw, Wednesbury, and Barry Stanley Morris, Bloxwich, both of England, assignors to The Bloxwich Lock and Stamping Company Limited, Walsall, England
Filed Apr. 12, 1976, Ser. No. 675,829
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—343

247,872
BOTTLE OR THE LIKE
Howard H. McIlvain, Cincinnati, Ohio, assignor to The Drackett Co.
Filed Oct. 7, 1976, Ser. No. 730,757
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—63

247,873
DECANTER
Adam J. Grodin, Forest Hills, N.Y., assignor to American Cyanamid Company, Stamford, Conn.
Filed Jul. 31, 1975, Ser. No. 600,706
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—64

247,874
BOTTLE OR THE LIKE
Jan Kuypers, 96 Bloor St. West, Toronto, Ontario, Canada
Filed Dec. 10, 1975, Ser. No. 639,262
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—71



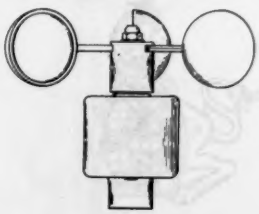
247,875
CLOSURE OR SIMILAR ARTICLE
Alfred W. Kinney, Kansas City, Mo., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Filed Jul. 1, 1976, Ser. No. 701,725
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—267

247,876
PACKAGING TRAY
Howard P. Garson, 15211 Preston Rd., Apt. 2004, Dallas, Tex. 75240, and Henry J. Crowley, 3941 Circle Bluff Ct., Dallas, Tex. 75234
Filed Aug. 25, 1976, Ser. No. 717,863
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—219

247,877
SQUARE
Siebolt Hettinga, Des Moines, Iowa, assignor to Foam Molding Corporation of Iowa, Des Moines, Iowa
Filed Sep. 7, 1976, Ser. No. 720,958
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—62

247,878
TAPE RULE BLADE
Laird Fortune Covey, Easton, Conn., assignor to The Stanley Works, New Britain, Conn.
Filed Jul. 9, 1976, Ser. No. 703,750
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—71

247,879
ANEMOMETER TRANSDUCER
R. A. Simerl, 528 Epping Forest Rd., Annapolis, Md. 21401
Filed Sep. 7, 1976, Ser. No. 720,797
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—96



247,880
COMBINED MEDALLION AND CHAIN
E. Ioma Lang, 4116 W. Tiller, Orange, Calif. 92668, assignor to E. Ioma Lang, Orange, Calif.
Filed Aug. 4, 1976, Ser. No. 711,679
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—7

247,881
SEPARABLE CHARM
Doreen M. Hitchens, 3631 Deloach St., Pensacola, Fla. 32504
Filed Aug. 2, 1976, Ser. No. 710,531
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—41

247,882
PENDANT
Donald E. Zimmerman, 2940 Morningside Dr., Salt Lake City, Utah 84117
Filed Jul. 26, 1976, Ser. No. 708,763
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D1101

247,883
PENDANT OR SIMILAR ARTICLE
Elda Krecic, New York, N.Y., assignor to Monet Jewelers, Inc., New York, N.Y.
Filed Apr. 19, 1976, Ser. No. 678,100
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D1182

247,884
PENDANT OR SIMILAR ARTICLE
Elda Krecic, New York, N.Y., assignor to Monet Jewelers, Inc., New York, N.Y.
Filed Apr. 19, 1976, Ser. No. 678,342
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D1182

247,885
PENDANT OR SIMILAR ARTICLE
Elda Krecic, New York, N.Y., assignor to Monet Jewelers, Inc., New York, N.Y.
Filed Apr. 19, 1976, Ser. No. 678,343
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D1182

247,886
PENDANT OR SIMILAR ARTICLE
Elda Krecic, New York, N.Y., assignor to Monet Jewelers, Inc., New York, N.Y.
Filed Apr. 19, 1976, Ser. No. 678,349
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D1182

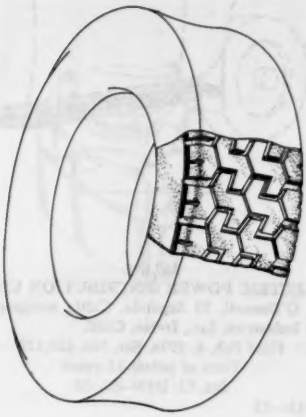
247,887
PENDANT OR SIMILAR ARTICLE
Elda Krecic, New York, N.Y., assignor to Monet Jewelers, Inc., New York, N.Y.
Filed Apr. 19, 1976, Ser. No. 678,345
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—82

247,888
PENDANT OR SIMILAR ARTICLE
Elda Krecic, New York, N.Y., assignor to Monet Jewelers, Inc., New York, N.Y.
Filed Apr. 19, 1976, Ser. No. 678,346
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—82

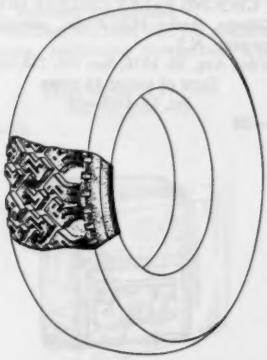
247,889
PENDANT OR SIMILAR ARTICLE
Elda Krecic, New York, N.Y., assignor to Monet Jewelers, Inc., New York, N.Y.
Filed Apr. 19, 1976, Ser. No. 678,347
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—83

247,890
VASE
Joan B. Sickul, 10 Hobson St., Stamford, Conn. 06902
Filed Jun. 1, 1976, Ser. No. 691,318
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—146

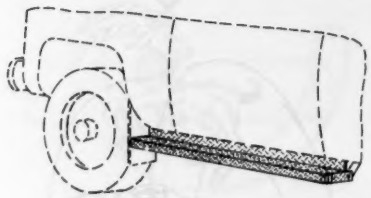
247,891
TIRE
Brian Sidney Bennett, Barton-Under-Needwood, England, assignor to Dunlop Limited, England
Filed Sep. 10, 1976, Ser. No. 722,290
Claims priority, application United Kingdom, Apr. 1, 1976, 975135/76
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—146



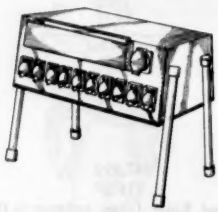
247,892
TIRE
Masafumi Kawakami, Kobe, Japan, assignor to Dunlop Limited, London, England
Filed Dec. 10, 1976, Ser. No. 749,707
Claims priority, application Japan, Jun. 15, 1976, 51-22380
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—151



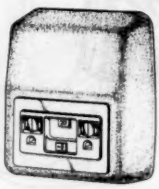
247,893
VEHICLE RUNNING BOARD
Merlyn C. Okland, 204 W. Broad St., Story City, Iowa 50248
Filed Apr. 8, 1976, Ser. No. 675,154
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—203



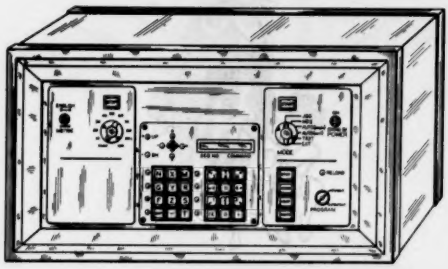
247,894
ELECTRIC POWER DISTRIBUTION UNIT
James M. O'Donnell, El Segundo, Calif., assignor to Astro-Nomical Industries, Inc., Irvine, Calif.
Filed Feb. 4, 1976, Ser. No. 655,120
Term of patent 14 years
Int. Cl. D13—*01, 02*
U.S. Cl. D13—12



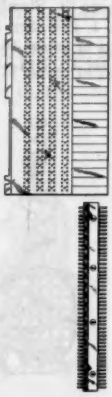
247,895
PORTABLE GROUND FAULT CIRCUIT INTERRUPTER
Stephen F. Gillette, Rocky Hill, Conn., assignor to General Electric Company, N.Y.
Filed Aug. 30, 1976, Ser. No. 718,964
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—30



247,896
CONTROL CONSOLE
Lee E. Cannon, and Amos R. Mansfield, both of Bozeman, Mont., assignors to Summit Engineering Company, Bozeman, Mont.
Filed Aug. 4, 1976, Ser. No. 711,751
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—32



247,897
TELEPHONE CONNECTOR BLOCK OR SIMILAR ARTICLE
Paul V. De Luca, 6901 Jericho Tpk., Syosset, N.Y. 11791
Filed Apr. 18, 1977, Ser. No. 788,229
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—52



247,898

AUTOMATIC TELEPHONE DIALING UNIT

Herman Plomp, Rijswijk, Zurich, and Jan Hendrik Lucas, Zoetermeer, both of Netherlands, assignors to Varel B.V., Netherlands

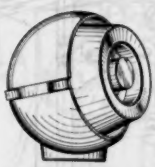
Filed Oct. 8, 1976, Ser. No. 730,861

Claims priority, application Netherlands, Apr. 8, 1976, 7650981

Term of patent 7 years

Int. Cl. D14—*03*

U.S. Cl. D14—58



247,899

POWERED SOIL WORKING TOOL

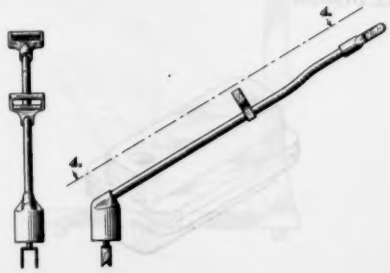
Samuel M. Underwood, Rte. 1, Box 274A, Blue Springs, Mo. 64015

Filed Jan. 7, 1977, Ser. No. 757,646

Term of patent 14 years

Int. Cl. D15—*03;* D8—*01*

U.S. Cl. D15—12



247,900

CIRCULAR KNITTING MACHINE

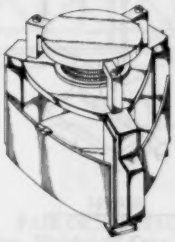
Wayne Allen Current, Cranford, N.J., assignor to The Singer Company

Filed Jul. 6, 1976, Ser. No. 702,559

Term of patent 14 years

Int. Cl. D15—*06*

U.S. Cl. D15—66



247,901

PORTABLE SEWING MACHINE

Marcel Fresard, Petit-Lancy, Geneva, Switzerland, assignor to Mefina S.A., Fribourg, Switzerland

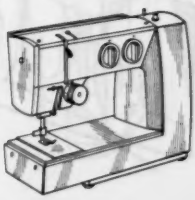
Filed Jun. 16, 1976, Ser. No. 696,862

Claims priority, application Switzerland, Dec. 23, 1975, 108160/75

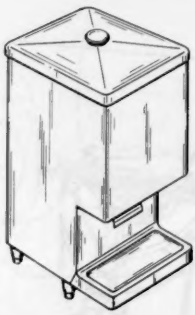
Term of patent 14 years

Int. Cl. D15—*06*

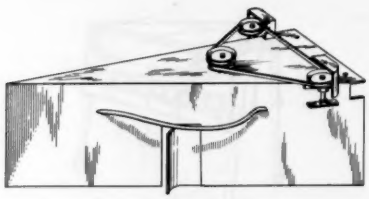
U.S. Cl. D15—70



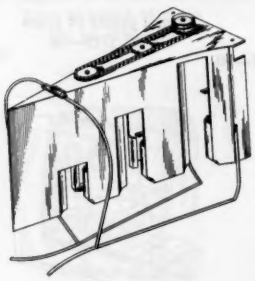
247,902
ICE SHAVING MACHINE
Israel Fudman, 6300 Red Cedar Pl., Baltimore, Md. 21209
Filed May 20, 1976, Ser. No. 688,471
Term of patent 14 years
Int. Cl. D15—*08;* D7—*04*
U.S. Cl. D15—101



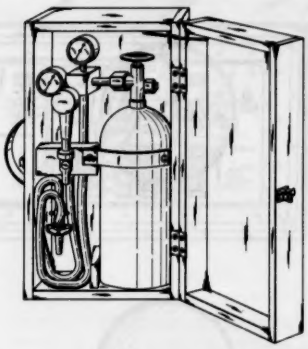
247,903
CORN DETASSELER
Lucio Chapa, III, 1229 Monroe Ave., Ottumwa, Iowa 52501
Filed May 5, 1976, Ser. No. 683,539
Term of patent 3½ years
Int. Cl. D15—*03*
U.S. Cl. D15—102



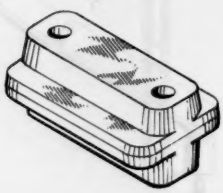
247,904
CORN DETASSELER
Lucio Chapa, III, 1229 Monroe Ave., Ottumwa, Iowa 52501
Filed May 5, 1976, Ser. No. 683,542
Term of patent 3½ years
Int. Cl. D15—*03*
U.S. Cl. D15—102



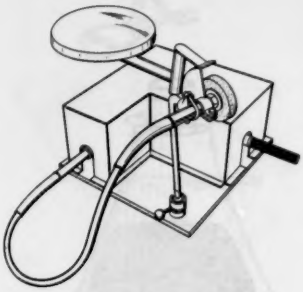
247,905
BEER KEG TAPPING KIT
Fred T. Malinky, 109 Buffalo St., Freeport, Pa. 16229
Filed Feb. 23, 1976, Ser. No. 660,227
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—112



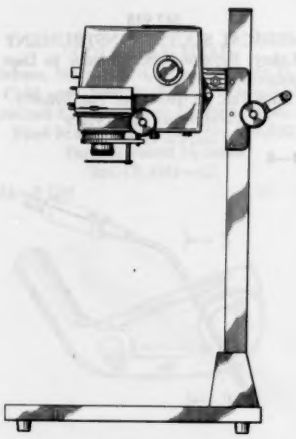
247,906
TENSIONING DEVICE FOR MOTORCYCLE DRIVE CHAIN
George M. Erl, 10261 Halawa, Huntington Beach, Calif. 92646
Filed Aug. 2, 1976, Ser. No. 710,689
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D15—148



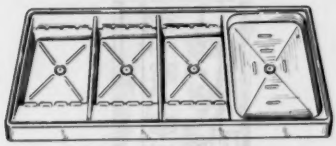
247,907
TIRE REFINISHING APPARATUS
James C. Satterfield, 10541 Royal Club Lane, Dallas, Tex. 75229
Filed Nov. 24, 1976, Ser. No. 744,688
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—199



247,908
PHOTOGRAPHIC ENLARGER
Claus Prochnow, Braunschweig, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany
Filed Dec. 28, 1976, Ser. No. 755,088
Claims priority, application Germany, Jul. 2, 1976, MR 1095
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—25



247,909
PHOTOGRAPHIC PROCESSING AND DEVELOPING SINK
Edward R. Noble, 1980 Gunn Rd., Rochester, Mich. 48063, and Russell O. Blanchard, 404 N. Madison Ave., Marshall, Mich. 49068
Filed Mar. 3, 1976, Ser. No. 663,456
Term of patent 14 years
Int. Cl. D16—*04;* D23—*02*
U.S. Cl. D16—35

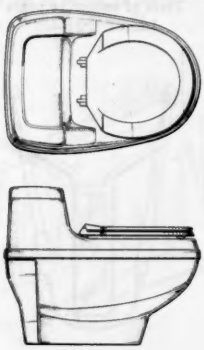


247,910
PAIR OF SPECTACLES
David W. Johnsen, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.
Filed Mar. 21, 1977, Ser. No. 779,422
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

247,911
SLINGSHOT
Howard Ellenburg, Columbus, Nebr., assignor to Trumark Manufacturing Co., Inc., Columbus, Nebr.
Filed Jan. 9, 1976, Ser. No. 647,785
Term of patent 14 years
Int. Cl. D22—*01*
U.S. Cl. D22—4

247,912
SHOWER STALL
Kenneth B. Rath, and Joyce A. Rath, both of Jackson County, Ill., assignors to Bracon Industries, Inc., Murphysboro, Ill.
Filed Nov. 26, 1976, Ser. No. 745,402
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—57

247,913
TOILET
Thomas Michael Whitney, Lapeer; Samuel C. Crosby, Ann Arbor, and Maurice F. Baldwin, Lapeer, all of Mich., assignors to Trayco, Inc., Lapeer, Mich.
Filed Jan. 24, 1977, Ser. No. 761,731
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—65

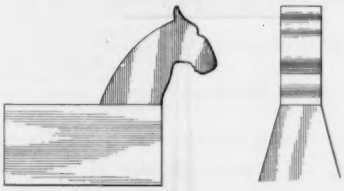


247,914
FIREPLACE
William H. Wiggins, Unit 12, 250 Don Park Rd., Markham, Ontario, Canada
Filed Nov. 29, 1976, Ser. No. 745,605
Claims priority, application Canada, Jul. 13, 1976, 1307761
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—97

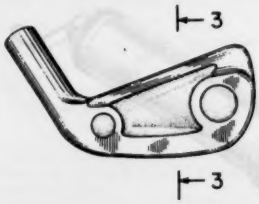
247,915
MEDICAL SUCTION INSTRUMENT
Charles A. Lahay, Fayette, Ala., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Jun. 23, 1976, Ser. No. 698,971
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D24—8

247,916
HANDLE FOR ATTACHMENT TO A DENTAL IMPRESSION TRAY
Peter C. Kesling, Orthodontic Center, La Porte, Ind. 46391
Filed Nov. 7, 1975, Ser. No. 629,768
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D24—16

247,917
TOY ANIMAL
Anthony Baron, 186 Hemlock St., Swoyersville, Pa. 18704
Filed Jul. 21, 1976, Ser. No. 707,273
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R



247,918
GOLF CLUB HEAD
Ralph L. Delano, Mattapoisett, Mass.; Charles D. Rambo, Escondido, Calif., and John W. Jepson, Marion, Mass., assignors to Acushnet Company, New Bedford, Mass.
Filed Mar. 11, 1976, Ser. No. 666,052
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

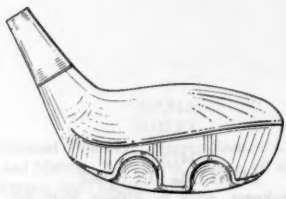


247,919
WEIGHTED GOLF CLUB PRACTICE DEVICE
Armand J. Goyette, Jr., 155 Rapin Pl., Buffalo, N.Y. 14211
Filed Jun. 4, 1976, Ser. No. 692,989
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CB

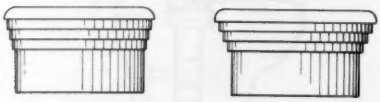
247,920
BOWLING PIN CORE
Robert H. Dykehouse, 4578 E. Fifteen Mile Rd., Sterling Heights, Mich. 48077
Filed Sep. 29, 1976, Ser. No. 727,674
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GP

247,921
CIGARETTE LIGHTER POUCH
Gerry G. Goldberg, 315 W. 57th St., New York, N.Y. 10019
Filed Apr. 13, 1977, Ser. No. 787,007
Term of patent 14 years
Int. Cl. D27—*05;* D3—*01*
U.S. Cl. D27—51

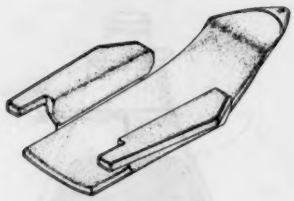
247,922
GOLF WOOD HEAD
John Charles Sheldon, 900 Wildrose Dr., Brea, Calif. 92621
Filed Nov. 26, 1976, Ser. No. 745,371
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



247,923
TOY PROJECTILE
Steven C. Bartz, 7017 Mark Terrace Dr., Edina, Minn. 55435
Division of Ser. No. 522,900, Nov. 11, 1974, abandoned. This application May 19, 1976, Ser. No. 688,035
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 PP



247,924
AQUATIC SLED
Senya Yamanaka, No. 128-39, Marunouchi, Ueno City, Mie Prefecture, Japan
Filed Jul. 27, 1976, Ser. No. 709,105
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—42

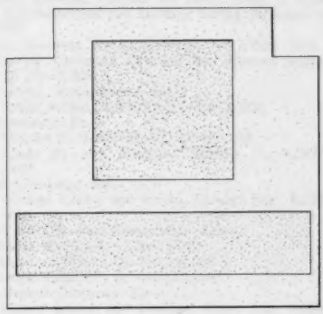


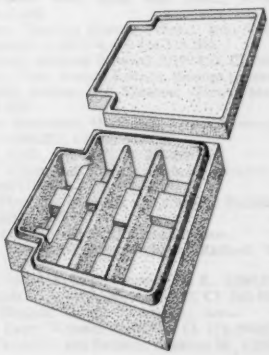
247,925
FLASHLIGHT
Jack M. Little, Jr., 5628 Linda, Watauga, Tex. 76148
Filed Jun. 15, 1977, Ser. No. 806,769
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 A

247,926
BANJO
Geoffrey H. Stelling, 8815 Kenwood Dr., Spring Valley, Calif. 92007
Filed Mar. 22, 1976, Ser. No. 669,049
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A

247,927
CALCULATOR CASING
Eugene Joseph Sulek, Richardson, and William James Lawrence, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed Sep. 2, 1976, Ser. No. 719,770
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B

247,928
CONTAINER FOR A DIABETIC'S EQUIPMENT
Arthur A. Gleichert, 2105-22nd Ave. S., Birmingham, Ala. 35223
Filed May 7, 1976, Ser. No. 684,092
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



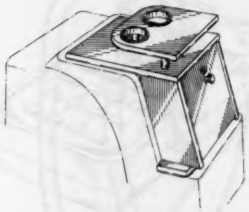


247,929

CONSOLE FOR MOTOR COVER OF A MOTOR VEHICLE

Larry R. Wynn, New Brighton, Pa., assignor to Luce Industries, Inc., Ashtabula, Ohio

Filed Nov. 17, 1976, Ser. No. 742,653
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D87—1 R



247,930

HAND BAG OR SIMILAR ARTICLE

Ilma R. Glaser, 101 Arundel, St. Louis County, Mo. 63105

Filed Mar. 11, 1976, Ser. No. 665,966
Term of patent 7 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 D

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 16TH DAY OF MAY, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A.B.C. Auto Alarms, Inc.: *See—*
Faust, James H.; and Biagioli, Billy J., 4,090,046, Cl. 200-44.000.

A.P.C. (Azote et Produits Chimiques) Catalysts & Chemicals Europe Societe: *See—*
Villemin, Bernard, 4,089,941, Cl. 423-654.000.

A-T-O, Inc.: *See—*
Long, Charles N., 4,089,153, Cl. 53-331.500.
Venzke, Charles E., 4,089,404, Cl. 198-365.000.

AB Kabi: *See—*
Jonsson, Nils Ake, 4,089,957, Cl. 424-248.560.

AB Wicanders Korkfabriker: *See—*
Jonsson, Knut, 4,089,433, Cl. 215-218.000.

Abraham, Nedumparambil A.; Bagli, Jehan F.; and Bogri, Tibor, to Ayerst, McKenna & Harrison Ltd. 11-Deoxyprostaglandin derivatives. 4,089,898, Cl. 260-514.00D.

Achmeteli, Hans Wano. Back pack device. 4,089,447, Cl. 224-25.00A.

Adair, Lyles C.; Teel, Willis A.; Werle, Christian P. F.; and Hutton, John A., to United States of America, Navy. Method and apparatus for determining relative phase and sensitivity of elements in an acoustic array. 4,090,169, Cl. 340-5.00C.

Adams, John Howard, to Chevron Research Company. Synergistic combinations of hydrated potassium borate, antiwear agents, and organic sulfide antioxidants. 4,089,790, Cl. 252-18.000.

Aero-Dri Corporation: *See—*
Razete, John J., 4,089,655, Cl. 23-288.00F.

Aeschbacher, Hans Manuel; and Bottlang, Johann, to Georg Fischer Aktiengesellschaft. Wear protective liner assembly. 4,089,465, Cl. 220-400.000.

Aeschliman, Eugene, to DeSoto, Inc. Hinge assembly for mounting sewing machine in cabinet. 4,089,573, Cl. 312-27.000.

AGA Aktiebolag: *See—*
Westberg, Johan Eric Hayden, 4,089,090, Cl. 29-6.100.

Agence Nationale de Valorisation de la Recherche (Anvar): *See—*
Leblanc, Michel, 4,090,141, Cl. 328-129.000.

Agency of Industrial Science & Technology: *See—*
Tateno, Hiroshi; Kataoka, Shoei; Hashizume, Nobuo; and Komamiya, Yasuo, 4,090,155, Cl. 333-80.00T.

Agfa-Gevaert AG: *See—*
Pfeifer, Josef; Paulus, Rudolf; Gutmann, Walter; and Resch, Michael, 4,090,206, Cl. 346-107.00R.

Agfa-Gevaert N.V.: *See—*
Van Paesschen, August Jean; and Van Gossum, Lucien Janbaptist, 4,089,997, Cl. 427-171.000.

Aida, Yoshio: *See—*
Muratsuka, Hiroshi; and Aida, Yoshio, 4,090,148, Cl. 330-207.00P.

Air-Industrie: *See—*
Mertzweiller nee Maillard, Anne-Marie; and Etienne, Guy, 4,090,001, Cl. 427-444.000.

Air-O-Matics, Inc.: *See—*
Noland, Richard D., 4,089,664, Cl. 55-341.00R.

Aisin Seiki Kabushiki Kaisha: *See—*
Murakami, Noboru; Hirosawa, Koichiro; Ohara, Kazuo; and Matsuo, Koichi, 4,089,239, Cl. 74-761.000.

Akiyoshi, Osamu; Mukai, Akio; and Miwa, Yoshihiro, to Mitsubishi Chemical Industries Ltd.; and Toyo Carbon Co., Ltd. Process for preparing carbon products. 4,089,934, Cl. 423-448.000.

Akoh, Shigeichi; Harada, Hiroo; Ueda, Yutaka; and Kurosawa, Masao, to Honshu Seishi Kabushiki Kaisha. Method for making a bag-in-carton. 4,089,255, Cl. 93-36.010.

Alberto, Pietro. Apparatus for the automatic insertion of diapositives into the frames to be used in stereopticon lanterns. 4,089,091, Cl. 29-785.000.

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Alexander, John Henry, to ITT Industries, Incorporated. Monolithic ceramic capacitors. 4,089,813, Cl. 252-520.000.

Alexander, William J., to Solid State Measurements, Inc. Measurement of excess carrier lifetime in semiconductor devices. 4,090,132, Cl. 324-158.00D.

Alker, Karl-Heinz: *See—*
Tiggesbaumker, Peter; and Alker, Karl-Heinz, 4,089,477, Cl. 241-78.000.

Allen Filters, Inc.: *See—*
Williams, Marvin R., 4,089,662, Cl. 55-166.000.

Allen, John D. Wall stake for vehicle sidewall paneling. 4,089,555, Cl. 296-28.00M.

Allen, Thomas S.: *See—*
Hornbaker, Edwin D.; Jones, Jesse D.; Kucsma, Michael E.; and Allen, Thomas S., 4,089,838, Cl. 260-40.00R.

Alliance Industries, Inc.: *See—*
Anderson, Willie E., 4,089,508, Cl. 366-7.000.

Allied Chemical Corporation: *See—*
Boggs, Beryl Aaron, 4,089,089, Cl. 28-299.000.
Gambrell, Lawrence Mitchell, 4,089,805, Cl. 252-373.000.
Mares, Frank; and Largman, Theodore, 4,089,649, Cl. 8-115.500.

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Ansari, Mohammad Tariq; and Gobert, Richard Lee, 4,090,181, Cl. 340-271.000.

Allinquant, Fernand Michel; and Allinquant, Jacques Gabriel. Pneumatic springs and other telescopic systems. 4,089,512, Cl. 267-65.00R.

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Allinquant, Fernand Michel; and Allinquant, Jacques Gabriel, 4,089,512, Cl. 267-65.00R.

Allis-Chalmers Corporation: *See—*
Haupt, Robert C.; and Peterson, Donald E., 4,089,394, Cl. 192-4.00A.
Worrix, Matthew L., 4,090,047, Cl. 200-48.00P.

Almer, Bengt Onnert; and Gidlof, Karl Gunnar. Concrete block, primarily intended for use as a road barrier. 4,089,615, Cl. 404-6.000.

Alonso, D. Manuel Dominguez, to Astilleros y Talleres Del Noroeste S.A. Tanks having membranes. 4,089,468, Cl. 220-441.000.

Althausen, Ferdinand: *See—*
Raffel, Reiner; Althausen, Ferdinand; Knipp, Ulrich; Krippl, Kurt; Fohr, Wolfgang; and Schwesig, Helmut, 4,089,206, Cl. 73-19.000.

Altwein, Michael, to Carl Schenck AG, Firma. Method and circuit arrangement for determining the vector components of an oscillation. 4,090,244, Cl. 364-603.000.

Aluminum Company of America: *See—*
Jennings, Charles E., 4,089,769, Cl. 204-245.000.

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Amada Company, Ltd.: *See—*
Amano, Tadashi; Kawano, Susumu; and Mano, Kenji, 4,089,198, Cl. 72-320.000.

Amano, Hideaki: *See—*
Sasamoto, Asao; and Amano, Hideaki, 4,090,117, Cl. 318-365.000.

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Warner, Ralph Selden, 4,090,125, Cl. 324-15.000.

Amerace Corporation: *See—*
Mazzeo, Charles F., 4,089,612, Cl. 403-361.000.
Triolo, Louis J.; and Morgan, Donald F., 4,089,718, Cl. 156-122.000.

American Can Company: *See—*
Meyers, George Leroy; and Kuehl, Donald Roy, 4,089,458, Cl. 229-32.000.

American Color & Chemical Corporation: *See—*
Botros, Raouf, 4,089,078, Cl. 8-41.00C.
Botros, Raouf, 4,089,849, Cl. 260-158.000.
Botros, Raouf, 4,089,850, Cl. 260-158.000.

American Cyanamid Company: *See—*
Angier, Robert Bruce; and Lindsay, Harry Lee, 4,089,965, Cl. 424-270.000.
Asato, Goro, 4,089,976, Cl. 424-322.000.
Bolanowski, Lelia Ann; and Flatau, Alison, 4,089,410, Cl. 206-63.300.
Conrow, Ransom Brown; Poletto, John Frank; and Bernstein, Seymour, 4,089,974, Cl. 424-319.000.
Lanzilotti, Anthony Edward, 4,089,853, Cl. 544-373.000.
Preston, Peter Joseph; Roberts, George Leathwhite, Jr.; Filimore, Dennis Arthur; and Sheehan, Gerard Martin, 4,089,675, Cl. 75-1.00T.
Raghu, Sivaraman; Hoffmann, Arthur Kentaro; and Singh, Balwant, 4,090,025, Cl. 548-320.000.
Singh, Ajaib, 4,089,905, Cl. 260-609.00R.
Singh, Ajaib; and Schmitt, Joseph Lawrence, Jr., 4,089,906, Cl. 260-609.00R.
Vial, Theodore Merriam; and Ermidis, Nicholas Peter, 4,089,822, Cl. 260-18.0TN.

American Home Products Corporation: *See—*
Foell, Theodore J.; and Rees, Richard W., 4,089,946, Cl. 424-177.000.
Freed, Meier E.; and Potoski, John R., 4,089,958, Cl. 424-250.000.
Husbands, George E. M., 4,089,885, Cl. 260-448.80R.

American Hospital Supply Corporation: *See—*
Blake, Larry Webster, 4,089,506, Cl. 251-196.000.
Heil, Donald J.; and Jaremus, Boubene M., 4,089,115, Cl. 32-27.000.

Amine, Youssef: *See—*
La Pietra, Jack, 4,089,143, Cl. 52-172.000.
AMP Incorporated: *See—*
Bierly, Meade Goodman, 4,090,234, Cl. 363-88.000.
Grabbe, Dimitry G., 4,089,575, Cl. 339-17.0CF.
Huffnagle, Clifton Wesley; and Ward, James Paul, 4,089,580, Cl. 339-99.00R.
Loomis, Phillip Eugene; Hammond, James Woodrow; and Shughart, Mervin Leonard, 4,089,405, Cl. 198-475.000.
Zimmerman, Richard Henry, 4,089,733, Cl. 156-630.000.
an der Heiden, Rainer E.: *See—*
Buchan, William A.; and an der Heiden, Rainer E., 4,090,215, Cl. 358-8.000.
Analytical Products, Inc.: *See—*
Smernoff, Ronald B., 4,089,748, Cl. 195-104.000.
Anderle, Fritz; Frey, Gerhard; Grein, Lutz; Reimpell. Uwe; and Stark, Friedrich, to Leybold-Heraeus GmbH & Co. Kommandit-Gesellschaft. Oscillating slide valve. 4,089,505, Cl. 251-133.000.
Anderson, Alvin M.; Comley, William; and Engum, Douglas B., to McDonnell Douglas Corporation. Reduced servo noise control for a hydraulic actuator. 4,089,494, Cl. 244-178.000.
Anderson, Willie E., to Alliance Industries, Inc. Method of processing bituminous paving mixtures and apparatus therefor. 4,089,508, Cl. 366-7.000.
Andrassy, Stella. Heater. 4,089,326, Cl. 126-271.000.
Andre, Thierry: *See—*
Melchior, Jean; and Andre, Thierry, 4,089,173, Cl. 60-606.000.
Andrews, Patrick Vassar: *See—*
Slaughter, Raymond Jeffrey; and Andrews, Patrick Vassar, 4,089,585, Cl. 350-96.230.
Anger, Klaus, to Siemens Aktiengesellschaft. Particle beam device with a deflection system and a stigmator. 4,090,077, Cl. 250-311.000.
Angier, Robert Bruce; and Lindsay, Harry Lee, to American Cyanamid Company. Thiazolylphenylguanidines as antirhinovirus agents. 4,089,965, Cl. 424-270.000.
Angstadt, Howard P., to Sun Ventures, Inc. Organometallic complexes as oxidation catalyst. 4,089,907, Cl. 260-610.00B.
Ansari, Mohammad Tariq; and Gobert, Richard Lee, to Allied Industries, Inc. Shaft rotation monitoring system. 4,090,181, Cl. 340-271.000.
Anscher, Bernard, to National Molding Corporation. Self-locking unitary molded plastic fastener. 4,089,248, Cl. 85-71.000.
Antonelli, Mario Eduardo, to Crown Cork & Seal Company, Inc. Filling valve for carbonated liquid bottling machines. 4,089,353, Cl. 141-302.000.
Antrim, Richard Lee; and Harris, Donald Wayne, to Standard Brands Incorporated. Process for enzymatically converting cellulose derived from corn hulls to glucose. 4,089,745, Cl. 195-33.000.
Aoki, Ryozo, to Citizen Watch Company Limited. Wrist band. 4,089,161, Cl. 59-80.000.
Applied Power, Inc.: *See—*
Patel, Kishor J.; and Carlson, Allen J., 4,089,252, Cl. 91-49.000.
Arai, Izumi; Yamada, Yasuteru; Mutsuta, Akio; Hirano, Hirotoshi; and Tuchida, Yasuzou, to Sumitomo Heavy Industries, Ltd.; and Sumitomo Metal Industries, Ltd. Method and apparatus for maintaining uniformity of mixed dust slurry stored in a basin. 4,089,507, Cl. 366-102.000.
Arai, Kazuo, to Nissan Denshi Kabushiki Kaisha. Combinated transceiver, cartridge tape player and radio unit. 4,090,134, Cl. 325-15.000.
Arai, Masatoshi: *See—*
Shinohara, Toshio; Arai, Masatoshi; and Kojima, Kenichi, 4,089,884, Cl. 260-448.20N.
Archer, Donald H., to Raytheon Company. Radio frequency beam forming network. 4,090,199, Cl. 343-100.0SA.
Ardamatsky, Vitaly Andreevich: *See—*
Lipets, Adolf Usherovich; Moskvichev, Viktor Fedorovich; Katyshev, Georgy Viktorovich; Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Shamarokova, Raisa Nikiforovna; Dolgy, Alexei Arsentievich; Eletsky, Stanislav Alexandrovich; Grinberg, Yakov Natanovich; Ardamatsky, Vitaly Andreevich; Vivsik, Svyatoslav Nikolaevich; Zavedeev, Vasily Evdokimovich; Zevin, Ilya Julievich; and Fadeev, Evgeny Alexeevich, 4,089,369, Cl. 165-158.000.
Arlt, Dieter: *See—*
Lantzsch, Reinhard; Uhrhan, Paul; Oertel, Harald; Roos, Ernst; and Arlt, Dieter, 4,089,841, Cl. 260-45.8SN.
Armantrout, Clo Elton: *See—*
O'Hare, Stephen A.; Mauser, James E.; and Armantrout, Clo Elton, 4,089,812, Cl. 252-466.00J.
Armco Steel Corporation: *See—*
Moffa, Joseph; and Boynton, Jerald H., 4,089,139, Cl. 52-20.000.
Armour Pharmaceutical Company: *See—*
Enkoji, Takashi; and Skibbe, Martin O., 4,089,821, Cl. 260-8.000.
Kozischek, James F., 4,089,120, Cl. 34-12.000.
Armstrong Cork Company: *See—*
Lewicki, Walter J., Jr., 4,089,731, Cl. 156-555.000.
Arnaud, Jean-Claude: *See—*
Bore, Pierre; Arnaud, Jean-Claude; and de Labbey, Arnaud, 4,089,942, Cl. 424-47.000.
Arneklev, Duane R.; Pallos, Ferenc M.; and Gaughan, Edmund J., to Stauffer Chemical Company. Halogenated ketones as herbicide antidotes. 4,089,673, Cl. 71-93.000.
Aron Sarl: *See—*
Cohen, Claude, 4,089,966, Cl. 424-272.000.
Artemov, Lev Nikolaevich: *See—*
Lipets, Adolf Usherovich; Moskvichev, Viktor Fedorovich; Katyshev, Georgy Viktorovich; Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Shamarokova, Raisa Nikiforovna; Dolgy, Alexei Arsentievich; Eletsky, Stanislav Alexandrovich; Grinberg, Yakov Natanovich; Ardamatsky, Vitaly Andreevich; Vivsik, Svyatoslav Nikolaevich; Zavedeev, Vasily Evdokimovich; Zevin, Ilya Julievich; and Fadeev, Evgeny Alexeevich, 4,089,369, Cl. 165-158.000.
Arthur D. Little, Inc.: *See—*
Martin, Peter G., 4,090,247, Cl. 364-900.000.
Asahi Glass Company Ltd.: *See—*
Yamabe, Masaaki; Munekata, Seiji; Kumai, Seisaku; and Samejima, Shunichi, 4,089,869, Cl. 260-343.500.
Asai, Akiji: *See—*
Thies, Peter Willibrord; and Asai, Akiji, 4,089,971, Cl. 424-278.000.
Asano, Masaharu; and Manaka, Nobuzi, to Nissan Motor Company, Limited. Closed-loop air-fuel mixture control apparatus for internal combustion engines with means for minimizing voltage swing during transient engine operating conditions. 4,089,313, Cl. 123-119.0EC.
Asato, Goro, to American Cyanamid Company. Synthesis of 1,2,3,4-tetrahydro-4-oxo-[or oxy-]-1-naphthylureas as novel growth-promoting compounds for animals. 4,089,976, Cl. 424-322.000.
ASEA AB: *See—*
Fahlen, Nils Torsten; Samuelsson, Jan; and Torseng, Sture Ragnar, 4,090,226, Cl. 361-16.000.
Ash, Leon: *See—*
Kraska, Irvin R.; Mathieson, Thomas A.; Johnson, Richard N.; Lichodziejewski, Wieslaw L.; Gamache, David Leo; and Ash, Leon, 4,089,225, Cl. 73-614.000.
Ashe, Thomas L., to Garrett Corporation, The. Heat storage method and apparatus. 4,089,176, Cl. 60-650.000.
Ashland Oil, Inc.: *See—*
Toeniskoetter, Richard H.; and Spiwak, John J., 4,089,692, Cl. 106-38.350.
Askienazy, Alexandre; Ken, Victor; and Souchet, Jean-Claude, to Compagnie Francaise de Produits Industriels. Phosphatation of metallic surfaces. 4,089,708, Cl. 148-6.15R.
Asp, Hans Eskil, to C J Wennberg AB. Method of and apparatus for regenerating a pressure filter. 4,089,781, Cl. 210-67.000.
Associated Portland Cement Manufacturers Limited, The: *See—*
Pennell, Anthony Robin, 4,089,697, Cl. 106-100.000.
Astilleros y Talleres Del Noroeste S.A.: *See—*
Alonso, D. Manuel Dominguez, 4,089,468, Cl. 220-441.000.
Astl, Franz. Building element. 4,089,144, Cl. 52-281.000.
Astra Pharmaceutical Products, Inc.: *See—*
Bamberg, Peter; Ekstrom, Bertil Ake; and Sjoberg, Berndt Olof Harald, 4,089,963, Cl. 424-270.000.
Aubel, John Anton; and Fox, Clarence Dennis, to Borg-Warner Corporation. Vacuum generator. 4,089,622, Cl. 417-188.000.
Augat Inc.: *See—*
Yeo, Herbert G.; and Nelson, John, 4,089,105, Cl. 29-626.000.
Auracher, Franz; and Kersten, Ralf, to Siemens Aktiengesellschaft. Method for making output/input coupler for multi-mode glass fibers. 4,089,583, Cl. 350-96.150.
Australian Atomic Energy Commission: *See—*
Watt, John Stanley; and Gravitis, Vilis Leonids, 4,090,074, Cl. 250-273.000.
Auto-Make Up: *See—*
Mattsson, Hjalmar Egon; Severinsson, Lars Magnus; and Carsten, Bengt Erik, 4,089,994, Cl. 427-140.000.
Autoflow Engineering Limited: *See—*
Soper, Peter Henry Hunt; Meehan, Michael John; and Rouse, John Reginald, 4,089,102, Cl. 29-527.500.
Autotronic Controls, Corp.: *See—*
Chapin, Leonard Lee, 4,089,215, Cl. 73-116.000.
Avica Equipment Limited: *See—*
Ward, Edward Anthony; and Barron, Leslie Charles, 4,089,351, Cl. 138-109.000.
Ayabe, Shinichi: *See—*
Furuya, Tsutomu; Ayabe, Shinichi; Kobayashi, Miyuki; and Tanimoto, Tadao, 4,089,606, Cl. 536-4.000.
Ayerst, McKenna & Harrison Ltd.: *See—*
Abraham, Nedumparambil A.; Bagli, Jehan F.; and Bogri, Tibor, 4,089,898, Cl. 260-514.00D.
B.D.F. Ltd.: *See—*
Bay, Eugene Howard, 4,089,658, Cl. 44-56.000.
B/K Patent Development, Inc.: *See—*
Burch, Lyndon W., 4,090,166, Cl. 337-360.000.
Baba, Masanao, to Nippon Cable System Inc. Control mechanism. 4,089,397, Cl. 192-.096.
Babbitt, John H., Jr., to Caterpillar Tractor Co. Eccentric pin and bushing means for mounting misaligned components. 4,089,613, Cl. 403-388.000.
Babiol, Pierre, to Societe Nouvelle de Bouchons Plastiques S.N.B.P. Screw caps. 4,089,463, Cl. 215-329.000.
Badger Company, The: *See—*
Miserlis, Constantine D.; and Lewis, Peter J., 4,089,365, Cl. 165-1.000.
Bagli, Jehan F.: *See—*
Abraham, Nedumparambil A.; Bagli, Jehan F.; and Bogri, Tibor, 4,089,898, Cl. 260-514.00D.
Bailey, John; Randell, Michael John; and Sherrington, Paul Richard, to Procter & Gamble Company, The. Orthophosphate and silica-containing composition. 4,089,795, Cl. 252-135.000.
Bain, Sujash Kumar. Module having collapsible properties. 4,089,147, Cl. 52-632.000.

Bakanov, Anatoly Fedorovich: *See—*
Lipets, Adolf Usherovich; Moskvichev, Viktor Fedorovich; Katyshev, Georgy Viktorovich; Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Shamarokova, Raisa Nikiforovna; Dolgy, Alexei Arsentievich; Eletsky, Stanislav Alexandrovich; Grinberg, Yakov Natanovich; Ardamatsky, Vitaly Andreevich; Vivsik, Svyatoslav Nikolaevich; Zavedeev, Vasily Evdokimovich; Zevin, Ilya Julievich; and Fadeev, Evgeny Alexeevich, 4,089,369, Cl. 165-158.000.

Baker, Charles Dewitt: *See—*
Couvillon, Lucien Alfred, Jr.; Grover, Thomas Reaks; Baker, Charles Dewitt; and Topham, William Sanford, 4,089,329, Cl. 128-2.00T.

Baker Perkins Holdings Limited: *See—*
Edwards, Albert, 4,089,362, Cl. 164-7.000.
Steels, Gordon, 4,089,438, Cl. 222-146.00C.

Baker, Robert: *See—*
Spenceley, Gene D.; Baker, Robert; and Page, Roger A., 4,089,677, Cl. 75-51.000.

Balance Systems, Inc.: *See—*
Fitzgibbon, Jack R., 4,089,085, Cl. 16-197.000.

Balchick, Elmer, to Towmotor Corporation. Drive mount housing for a vehicle. 4,089,386, Cl. 180-64.00R.

Balon, Albert J. Method of forming a fluid seal between a tube and fitting. 4,089,101, Cl. 29-523.000.

Baltz, Harold D. Self-loading trailer. 4,089,425, Cl. 214-1.0HH.

Bamberg, Peter; Ekstrom, Bertil Ake; and Sjoberg, Berndt Olof Harald, to Astra Pharmaceutical Products, Inc. Esters of amidinopenicillanic acids, pharmaceutical preparations and method for treating infectious diseases. 4,089,963, Cl. 424-270.000.

Banerjea, Tara N.; and Stinson, Donald B., Jr., to Fruehauf Corporation. Roof system for vans. 4,089,558, Cl. 296-137.00R.

Barber-Colman Company: *See—*
Jornod, Eugene R., 4,090,060, Cl. 219-216.000.

Barchet, Reinhold J., to General Electric Company. Insulated connection of photovoltaic devices. 4,089,576, Cl. 339-18.00P.

Barchi, Henry J., to Congoleum Corporation. Apparatus for spreading foam material. 4,089,296, Cl. 118-413.000.

Barghout, Alexander S.; and Washak, Richard A. Combustion vapor generator. 4,089,633, Cl. 431-208.000.

Barkman, Erick F.; Jackson, John Harry; and Ward, Bennie Ray, Jr., to Reynolds Metals Company. Armor. 4,090,011, Cl. 428-653.000.

Barnett, Edward Charles: *See—*
Collie, Arthur Alexander; Charles, Barry Graham; Barnett, Edward Charles; and Ramshaw, Jack, 4,089,478, Cl. 241-167.000.

Baron, Gerhard; Rudolph, Paul; Kohlen, Rudolf; and Hafke, Carl, to Metallgesellschaft Aktiengesellschaft. Process for producing a lean gas by the gasification of a fuel mainly in lump form. 4,089,659, Cl. 48-197.00R.

Baron, Samuel Philip: *See—*
Vercellone, Robert Joseph; and Baron, Samuel Philip, 4,089,211, Cl. 73-93.000.

Barowitz, Peter Jack; and Baxendale, Roy, to Elliott Brothers (London) Limited. Vibration-responsive intruder alarm system. 4,090,180, Cl. 340-261.000.

Barron, Leslie Charles: *See—*
Ward, Edward Anthony; and Barron, Leslie Charles, 4,089,351, Cl. 138-109.000.

Barry, Richard Francis; Gourley, Charles Angus; and Kohanek, Dennis George, to Litton Systems, Inc. Method and apparatus for preassembling a printed circuit board connector. 4,089,104, Cl. 29-626.000.

Barthel, Richard C.: *See—*
Swanson, James R.; DiCesare, Sam; and Barthel, Richard C., 4,090,248, Cl. 364-900.000.

BASF Aktiengesellschaft: *See—*
Bronstert, Klaus; Ladenberger, Volker; Druschke, Wolfgang; Groh, Wolfgang; and Mueller, Helmut, 4,089,824, Cl. 260-27.0BB.
Buchan, William A.; and an der Heiden, Rainer E., 4,090,215, Cl. 358-8.000.

BASF Farben & Fasern AG: *See—*
Pantzer, Rudiger; and Ruf, Josef, 4,089,690, Cl. 106-14.230.

BASF Wyandotte Corporation: *See—*
Ciko, John D.; Cramer, John J.; and Jamieson, Geoffrey A., 4,089,786, Cl. 252-8.800.
Krumpelt, Michael; and Hirozawa, Stanley Tariho, 4,089,759, Cl. 204-98.000.
Schmolka, Irving R., 4,089,814, Cl. 252-522.000.

Battelle Development Corporation, The: *See—*
Gauger, Jurgen, 4,089,778, Cl. 210-23.00F.

Battelle Memorial Institute: *See—*
Schneider, Michel, 4,089,801, Cl. 252-316.000.

Baugh, Karol, to Impact Industries, Inc. Musical instrument reed storage assembly. 4,089,412, Cl. 206-314.000.

Baum, Gerald L.: *See—*
Freed, Donald L., Jr.; and Baum, Gerald L., 4,089,403, Cl. 198-316.000.

Baumeister, Frederick F. Cutter for asphalt paving. 4,089,562, Cl. 299-94.000.

Baumgartner, Erich Rudolf; and Doehler, Peter. Smoothing or pressing iron having a sole body consisting at least partially of a glass material. 4,089,128, Cl. 38-93.000.

Baumgartner, Henri; Jacquemet, Andre; Meier, John George; and Vollerin, Bernard, to Fascione, Pietro. Process and apparatus for controlled recycling of combustion gases. 4,089,629, Cl. 431-9.000.

Baumgartner, Henri: *See—*
Vollerin, Bernard; and Baumgartner, Henri, 4,089,630, Cl. 431-9.000.

Baxendale, Roy: *See—*
Barowitz, Peter Jack; and Baxendale, Roy, 4,090,180, Cl. 340-261.000.

Baxter Travenol Laboratories, Inc.: *See—*
Thomas, William R., 4,089,944, Cl. 424-101.000.

Bay, Eugene Howard, to B.D.F. Ltd. Coal extraction and fuel additive made therefrom. 4,089,658, Cl. 44-56.000.

Bayer AG: *See—*
Lantzsch, Reinhard; Uhrhan, Paul; Oertel, Harald; Roos, Ernst; and Arlt, Dieter, 4,089,841, Cl. 260-45.8SN.

Bayer Aktiengesellschaft: *See—*
Brandt, Horst; Hornle, Reinhold; Wolf, Karlheinz; and Molls, Hans-Heinz, 4,089,700, Cl. 106-309.000.
Hofen, Willi; Schreyer, Gerd; Wirthwein, Rolf; Waldmann, Helmut; and Siekmann, Gerd, 4,089,892, Cl. 260-502.00R.
Jager, Horst, 4,089,895, Cl. 260-509.000.
Konig, Klaus; and Dietrich, Manfred, 4,089,835, Cl. 260-31.600.
Kramb, Hans, 4,089,851, Cl. 260-160.000.
Merten, Rudolf; and Rottmaier, Ludwig, 4,089,860, Cl. 544-295.000.
Raffel, Reiner; Althausen, Ferdinand; Knipp, Ulrich; Krippl, Kurt; Fohr, Wolfgang; and Schwesig, Helmut, 4,089,206, Cl. 73-19.000.
Schroeder, Josef, 4,090,018, Cl. 542-458.000.
Ziemek, Peter; Raue, Roderich; and Buysch, Hans-Josef, 4,089,901, Cl. 260-570.00D.

Bayerlein, Friedrich: *See—*
Habereder, Peter; and Bayerlein, Friedrich, 4,089,646, Cl. 8-7.000.

Bayne, Ralph H.; and Fields, Vestel. Spare tire mount device. 4,089,449, Cl. 224-42.240.

Beale, Robert James: *See—*
Lugay, Joaquin Castro; Haas, Gerhard Julius; and Beale, Robert James, 4,089,978, Cl. 426-32.000.

Bearinger, Wells Stone, to Quick Point Pencil Co., Inc. Paper holder. 4,089,116, Cl. 33-107.00R.

Beaston, Bud A. Horseshoe bending apparatus and vise. 4,089,160, Cl. 59-56.000.

Bechler, Andre. Automatic turret lathe. 4,089,241, Cl. 82-21.00A.

Becker, Manfred E., to Textron Inc. Seal means for a self-aligning bearing and method of making the same. 4,089,095, Cl. 29-149.50B.

Beckman Instruments, Inc.: *See—*
Hoffa, Jack L., 4,090,263, Cl. 366-273.000.

Beckmann, Georg, to Waagner-Biro Aktiengesellschaft. Apparatus for supplying feedwater to a steam generator. 4,089,304, Cl. 122-412.000.

Becton, Dickinson and Company: *See—*
Nichols, Philip Thorbus; and Watts, Paul Jene, 4,089,624, Cl. 417-362.000.
Vistins, Maris, 4,089,069, Cl. 2-161.00R.

Becton, Dickinson Electronics Company: *See—*
Cencel, J. Arthur; Voge, Andrew; and Mullins, Barry W., 4,090,229, Cl. 361-288.000.

Beer, Rio. Machine for treating hollow bowl-shaped objects. 4,089,080, Cl. 15-56.000.

Beg, Mirza M. A., to SmithKline Corporation. Method of inhibiting platelet aggregation. 4,089,970, Cl. 424-275.000.

Beitner, Shlomo, to Bipol Ltd. Hand case. 4,089,184, Cl. 62-3.000.

Bejerman, Osvaldo: *See—*
Brettschneider, Johannes; Bianchi, Valerio; Bejerman, Osvaldo; Bundesen, Lorenz; and Zeller, Hans, 4,089,311, Cl. 123-119.0EC.

Bekaert-Cockerill: *See—*
Van de Loock, Guido, 4,089,485, Cl. 242-77.200.

Bell, Albert; Boocock, John Roger Brooke; and Oughton, Richard Walton, to Du Pont of Canada Limited. Extraction of protein food values from oats. 4,089,848, Cl. 260-112.00R.

Bell Telephone Laboratories, Incorporated: *See—*
Biggs, Ronald Dee, 4,090,038, Cl. 179-99.000.
Connor, Denis John, 4,090,221, Cl. 358-166.000.
Dimmick, James Owen, 4,090,237, Cl. 364-200.000.
Ewin, James Coe, 4,089,594, Cl. 350-262.000.
French, William George; and Tasker, G. William, 4,089,586, Cl. 350-96.300.
Heiss, John Herbert, Jr.; and Wylie, John Robert, 4,089,704, Cl. 134-29.000.
Klyce, Battle Hargrove; Sansone, Frank Peter; and Ziegler, Roger Mark, 4,090,133, Cl. 324-186.000.
Moylan, Philip John, 4,090,034, Cl. 179-7.10R.
Schweitzer, Joseph Gilbert Donald, 4,090,227, Cl. 361-57.000.
Seidel, Harold, 4,090,147, Cl. 330-10.000.

Bell, William W., Jr.; and Bussjager, Rudy C., to Carrier Corporation. Flow divider for evaporator coil. 4,089,368, Cl. 165-139.000.

Bell, William W., III; Cox, Lamar; and Rubin, William L., to Sperry Rand Corporation. Optical data communication system. 4,090,067, Cl. 250-199.000.

Bendix Corporation, The: *See—*
Patton, Jesse C., 4,089,207, Cl. 73-23.100.

Benjamin, Jack W.; and Helfgott, Samson. Telephone set. 4,090,037, Cl. 179-90.0AN.

Benken, William B.: *See—*
Berger, Kenneth L.; Nassar, Jorge J.; and Benken, William B., 4,089,980, Cl. 426-69.000.

Bennes Marrel: *See—*
Corompt, Antoine, 4,089,435, Cl. 214-304.000.

Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., to Motorola, Inc. N-channel field effect transistor integrated circuit microprocessor requiring only one external power supply. 4,090,236, Cl. 364-200.

Benvau, Eugene H.: *See—*
Stephens, John A.; Benvau, Eugene H.; and Benvau, Lee R., 4,089,920, Cl. 264-63.000.

Benvau, Lee R.: *See—*
Stephens, John A.; Benvau, Eugene H.; and Benvau, Lee R., 4,089,920, Cl. 264-63.000.

Beny, Janos; and Meggs, Daniel H. Sliding door assembly. 4,089,135, Cl. 49-257.000.

Berger, Bernard B., to Ducane Heating Corporation. Gas fired barbecue unit. 4,089,258, Cl. 99-339.000.

Berger, Dietmar; and Eng, Jackson, to Exxon Research & Engineering Co. Low pour middle distillates from wide-cut petroleum fractions. 4,089,775, Cl. 208-111.000.

Berger, Gunvald Magnus Svante. Apparatus for supporting demountable freight carriers on vehicles. 4,089,539, Cl. 280-179.00R.

Berger, Horst H.; Heuber, Klaus; Klein, Wilfried; Najmann, Knut; and Wiedmann, Siegfried, to International Business Machines Corporation. Circuit arrangement for operating a semiconductor memory system. 4,090,255, Cl. 365-154.000.

Berger, Kenneth L.; Nassar, Jorge J.; and Benken, William B., to Syntex (U.S.A.) Inc. Process for NPN ruminant feed supplement. 4,089,980, Cl. 426-69.000.

Bergman, Charles T.; and Zwieg, Robert L., to Brandt, Inc. Coin wrapping machine. 4,089,151, Cl. 53-59.00R.

Bergmark, Nils Randolf; and Westermark, Thord Ingvar Eugen, to Futurumverken AB. Kitchen ventilator. 4,089,328, Cl. 126-299.00D.

Berland, Ole, to Berland, Ole. Hearing aid with acoustical frequency response modification. 4,090,040, Cl. 179-107.0FD.

Bernard, Stanley E.; Flouris, Soto F.; and Malhoit, Edward C., to Xerox Corporation. Portable viewer. 4,089,593, Cl. 350-236.000.

Bernardi, Luigi; Elli, Carlo; Falconi, Giovanni; and Ferrari, Rosella, to Societa' Farmaceutici Italia S.p.A. Pyridyl substituted ergoline derivatives. 4,089,862, Cl. 260-285.500.

Bernecker, Gunther, to Conlin, Donald B., a part interest. Carburetor. 4,089,314, Cl. 123-133.000.

Bernstein, Seymour: *See—*
Conrow, Ransom Brown; Poletto, John Frank; and Bernstein, Seymour, 4,089,974, Cl. 424-319.000.

Berry, Robert W., Jr., to Smith International, Inc. Method and apparatus for installing a cutterhead upon a box hole boring machine. 4,089,100, Cl. 29-428.000.

Berst, Theodore H.; and Meyers, Paul A. Tennis stroke trainer. 4,089,521, Cl. 273-29.00A.

Bertin & Cie: *See—*
Marchal, Philippe Albert Hippolyte, 4,089,370, Cl. 165-159.000.

Bessler, Donald U., to Petrolite Corporation. Demulsification of surfactant-petroleum-water flood emulsions. 4,089,803, Cl. 252-344.000.

Biagioli, Billy J.: *See—*
Faust, James H.; and Biagioli, Billy J., 4,090,046, Cl. 200-44.000.

Bianchi, Valerio: *See—*
Brettschneider, Johannes; Bianchi, Valerio; Bejerman, Osvaldo; Bundesen, Lorenz; and Zeller, Hans, 4,089,311, Cl. 123-119.0EC.

BICC Limited: *See—*
Slaughter, Raymond Jeffrey; and Andrews, Patrick Vassar, 4,089,585, Cl. 350-96.230.

Bickel, Hans: *See—*
Schneider, Peter; and Bickel, Hans, 4,089,955, Cl. 424-246.000.

Bierig, Robert W., to Raytheon Company. Integrated circuit fusing technique. 4,089,734, Cl. 156-656.000.

Bierly, Meade Goodman, to AMP Incorporated. Input tap changer. 4,090,234, Cl. 363-88.000.

Biggs, Ronald Dee, to Bell Telephone Laboratories, Incorporated. Audio signal on hold circuit. 4,090,038, Cl. 179-99.000.

Bildstein, Hubert: *See—*
Machenschalk, Rudolf; and Bildstein, Hubert, 4,090,103, Cl. 313-330.000.

Binder, Dieter; Hromatka, Otto; Pfister, Rudolf; and Zeller, Paul, to Hoffmann-La Roche Inc. Thienothiazine derivatives. 4,090,020, Cl. 544-48.000.

Binder, Johann: *See—*
Widmann, Dietrich; and Binder, Johann, 4,090,068, Cl. 250-201.000.

Binns, Lloyd S. Hole filling blind rivet. 4,089,249, Cl. 85-72.000.

Biochemie: *See—*
Knauseder, Franz; and Wagner, Helmut, 4,089,891, Cl. 560-188.000.

Bipol Ltd.: *See—*
Beitner, Shlomo, 4,089,184, Cl. 62-3.000.

Birchell, Thomas H.: *See—*
Morton, James L.; Birchell, Thomas H.; Noble, James M.; and Jenson, David W., 4,089,509, Cl. 366-8.000.

Bissonette, Vernon L., to Eastman Kodak Company. Reversal imaging process including redox amplification. 4,089,685, Cl. 96-22.000.

Bitzel, Hubert: *See—*
Herb, Eugen; and Bitzel, Hubert, 4,089,244, Cl. 83-220.000.

Blackburn, John Bryce; and Field, Arnold William, to Ciba-Geigy Corporation. Pigment preparation. 4,089,699, Cl. 106-308.00Q.

Blackburn, Philip Richard, to Union Carbide Corporation. Pulverized coal arc heated igniter system. 4,089,628, Cl. 431-6.000.

Blackwood, Robert K.; and Stephens, Charles R., Jr., to Pfizer Inc. Antimicrobial agents. 4,089,900, Cl. 260-559.0AT.

Blaiklock, William Musgrave; and Korody, Ronald Sherwin John, to Tridon Limited. Flasher switch with outage indication. 4,090,094, Cl. 307-132.00M.

Blake, A. Webster, to Dahlberg Industries. Personal transporation system. 4,089,270, Cl. 104-130.000.

Blake, Larry Webster, to American Hospital Supply Corporation. Gate valve. 4,089,506, Cl. 251-196.000.

Blanchard, Vernon F. Method and aid for preparing NC control programs for machine tools. 4,090,240, Cl. 364-300.000.

Blood, John D.; and Inbody, Melvin R., to Centerline Steering Safety Axle Corporation, The. Power driven centerline steering safety axle wheel assembly with disc brake. 4,089,383, Cl. 180-43.00R.

Bloom, Stanley M.; Borror, Alan L.; and Greenwald, Richard B., to Polaroid Corporation. Certain benzothiazolium compounds. 4,089,866, Cl. 260-304.00C.

Blount, David H. Process for the production of epoxy silicate resinous products. 4,089,840, Cl. 260-46.50R.

Blount, David H. Process for the production of organic hydroxy silicate compounds and their condensation products. 4,089,883, Cl. 260-448.80R.

Bluestein, Leo I.: *See—*
Goyal, Shri K.; and Bluestein, Leo I., 4,090,217, Cl. 358-37.000.

Bocher, Dominique. Creatinine pyrrolidone carboxylate, pharmaceutical compositions and methods of use thereof. 4,089,967, Cl. 424-273.00R.

Boeing Company, The: *See—*
Harmke, Charles Raymond; and O'Neill, Daniel Edward, 4,089,422, Cl. 209-137.000.

Boggs, Beryl Aaron, to Allied Chemical Corporation. Method of unwinding. 4,089,089, Cl. 28-299.000.

Boggs, Ronald M.: *See—*
Lomax, Donald P.; and Boggs, Ronald M., 4,089,466, Cl. 220-454.000.

Bogri, Tibor: *See—*
Abraham, Nedumparambil A.; Bagli, Jehan F.; and Bogri, Tibor, 4,089,898, Cl. 260-514.00D.

Bohinc, Richard J.: *See—*
Tragesser, Charles W.; Vaill, Ronald E.; Bohinc, Richard J.; and Racki, Francis R., 4,090,052, Cl. 200-150.00R.

Bohm, Georg Gustav Anton, to Firestone Tire & Rubber Company, The. Pneumatic tire containing an irradiated laminated component. 4,089,360, Cl. 152-330.00R.

Bohni, Erika; and Montavon, Marc, to Hoffmann-La Roche Inc. Antibacterial compositions. 4,089,950, Cl. 424-229.000.

Bolanowski, Lelia Ann; and Flatau, Alison, to American Cyanamid Company. Package for fine sutures, non-needled, single or double armed. 4,089,410, Cl. 206-63.300.

Bolte, Wallace B.: *See—*
Kirschman, Fred C.; and Bolte, Wallace B., 4,089,750, Cl. 202-180.000.

Bomboire, Rene F., to Eurofloor S.A. Composite textured products and their manufacture. 4,089,724, Cl. 156-277.000.

Boninchi S.A.: *See—*
Wenger, Karl, 4,089,158, Cl. 58-73.000.

Boocock, John Roger Brooke: *See—*
Bell, Albert; Boocock, John Roger Brooke; and Oughton, Richard Walton, 4,089,848, Cl. 260-112.00R.

Borchert, Hugo E.: *See—*
Hyland, Francis P.; Borchert, Hugo E.; and Pilon, Harlan J., 4,089,402, Cl. 400-625.000.

Borden, Inc.: *See—*
Luttinger, Manfred; Cremeans, George E.; and Nowacki, Louis J., 4,089,837, Cl. 260-38.000.

Bore, Pierre; Arnaud, Jean-Claude; and de Labbey, Arnaud, to L'Oreal. Deodorant composition and process. 4,089,942, Cl. 424-47.000.

Borg-Warner Corporation: *See—*
Aubel, John Anton; and Fox, Clarence Dennis, 4,089,622, Cl. 417-188.000.
Carr, Lawrence J., 4,089,893, Cl. 260-502.40R.
Fogelberg, Mark John, 4,089,395, Cl. 192-41.00A.
Van Laeys, Edward James, 4,089,188, Cl. 62-290.000.

Borror, Alan L.: *See—*
Bloom, Stanley M.; Borror, Alan L.; and Greenwald, Richard B., 4,089,866, Cl. 260-304.00C.

Botros, Raouf, to American Color & Chemical Corporation. Arylazopyrazolone dyes for polyester. 4,089,078, Cl. 8-41.00C.

Botros, Raouf, to American Color & Chemical Corporation. Monoazo dyes having a benzthiazolyl substituted phenol or naphthol coupling component. 4,089,849, Cl. 260-158.000.

Botros, Raouf, to American Color & Chemical Corporation. Disazo dyes having a benzthiazolyl substituted phenol or naphthol coupling component. 4,089,850, Cl. 260-158.000.

Bottlang, Johann: *See—*
Aeschbacher, Hans Manuel; and Bottlang, Johann, 4,089,465, Cl. 220-400.000.

Boynton, Jerald H.: *See—*
Moffa, Joseph; and Boynton, Jerald H., 4,089,139, Cl. 52-20.000.

Boynton, Kenneth G., to Hollis Engineering, Inc. Solvent cleaning system. 4,089,339, Cl. 134-73.000.

Bradford, George J., to International Telephone & Telegraph Corporation. Temperature control system including K-Factor adjustment. 4,089,462, Cl. 236-68.00B.

Bradley, Thompson G.: *See—*
Sharma, Ram A.; and Bradley, Thompson G., 4,089,931, Cl. 423-290.000.

Brand, Derek R.: *See—*
Meyer, Burton C.; Imatt, Alex; and Brand, Derek R., 4,089,598, Cl. 353-17.000.

Brandt, Cecil R. Furnace, especially a coal burning furnace, and method of operation. 4,089,278, Cl. 110-206.000.

Brandt, Horst; Hornle, Reinhold; Wolf, Karlheinz; and Molls, Hans-

Heinz, to Bayer Aktiengesellschaft. Process for the preparation of opaque organic pigments. 4,089,700, Cl. 106-309.000.

Brandt, Inc.: *See—*
Bergman, Charles T.; and Zwieg, Robert L., 4,089,151, Cl. 53-59.00R.

Branecky, Anthony J.; and Harris, David W., to Celanese Corporation. Methanol purification. 4,089,886, Cl. 260-450.000.

Braukmann Armaturen A.G.: *See—*
Gocke, Eberhard, 4,089,461, Cl. 236-42.000.

Braun, Helmut; Rinno, Helmut; Reinecke, Rolf; Stelzel, Werner; and Winstel, Wolfgang, to Hoechst Aktiengesellschaft. Process for the manufacture of plastics dispersions. 4,089,829, Cl. 260-29.60T.

Braun, Roland Joseph, to International Business Machines Corporation. Rotational field generator for bubble memory package. 4,090,252, Cl. 365-2.000.

Brayman, Kenneth Wood: *See—*
Amaral, Louis; Brayman, Kenneth Wood; and Smith, Bart Alan, 4,089,742, Cl. 176-78.000.

Braymer, George W.: *See—*
Crankshaw, Gary K.; and Braymer, George W., 4,089,432, Cl. 215-6.000.

Braytenbah, Andrew; and Podolsky, Leaman, to Westinghouse Electric Corp. System and method for operating a steam turbine with protection provisions for a valve positioning contingency. 4,090,065, Cl. 364-494.000.

Brechelt, Karlheinz: *See—*
Wehling, Karl; and Brechelt, Karlheinz, 4,090,210, Cl. 362-419.000.

Bremer, Noel J.; White, James F.; and Milberger, Ernest C., to Standard Oil Company, The. Preparation of maleic anhydride from four-carbon hydrocarbons. 4,089,870, Cl. 260-346.750.

Brettschneider, Johannes; Bianchi, Valerio; Bejerman, Osvaldo; Bundesen, Lorenz; and Zeller, Hans, to Robert Bosch GmbH. Fuel supply system for internal combustion engines. 4,089,311, Cl. 123-119.0EC.

Briggs, Eugene C.; Chakrawarti, Shekhar; Wellbaum, William C.; and Shaftner, Robert F., to Koehring Company. Portable space heater. 4,089,642, Cl. 432-222.000.

Brightman, Alvin. Differential pressure actuated switch with contact on diaphragm. 4,090,048, Cl. 200-83.00N.

Brinkman, Richard Edward; and Vogenthaler, Robert Loren, to Procter & Gamble Company, The. Antidandruff shampoos containing metallic cation complex to reduce in-use sulfide odor. 4,089,945, Cl. 424-164.000.

Brinkmann, Uwe Hans Werner. Method and apparatus for mass analysis by multi-pole mass filters. 4,090,075, Cl. 250-282.000.

British Steel Corporation: *See—*
Spenceley, Gene D.; Baker, Robert; and Page, Roger A., 4,089,677, Cl. 75-51.000.

Brockman, William Harry; and Cannata, Robert Frank, to Iowa State University Research Foundation, Inc. Optical signal processing system and method. 4,089,589, Cl. 350-162.0SF.

Brola, Gabriel, to Entreprise Industrielle de Chaudronnerie. Solar heated boiler. 4,089,325, Cl. 126-271.000.

Bronstert, Klaus; Ladenberger, Volker; Druschke, Wolfgang; Groh, Wolfgang; and Mueller, Helmut, to BASF Aktiengesellschaft. Hot-melt pressure-sensitive adhesives based on block copolymers. 4,089,824, Cl. 260-27.0BB.

Brookman, Donald, to Burvell Canada Company Limited. Deflecting means. 4,089,665, Cl. 55-457.000.

Brown, Boveri & Cie Aktiengesellschaft: *See—*
Kielhorn, Werner; Heyduk, Gerhard; and Hochstrasser, Otto, 4,090,058, Cl. 219-156.000.

Brown Boveri Corporation: *See—*
Heine, Hans Gunther; and Hochstrasser, Otto, 4,090,054, Cl. 219-10.49R.

Brown, Dennis L.; Gee, Gordon E.; and Wilson, Michael A., to Electro Corporation. Housing and control circuit assembly with sensing element. 4,090,091, Cl. 307-116.000.

Brown, Harold Thomas: *See—*
Byatt, Dennis William George; and Brown, Harold Thomas, 4,090,212, Cl. 357-24.000.

Brown, John S.; and Forney, Robert B., to N.P.I. Corporation. Patty finishing cooker. 4,089,260, Cl. 99-386.000.

Brown, Michael Joseph; Cartwright, David; Collins, David John; and White, Brian Graham, to Imperial Chemical Industries Limited. Selective herbicides. 4,089,674, Cl. 71-94.000.

Brown, Robert W.: *See—*
Foris, Peter L.; Brown, Robert W.; and Phillips, Paul S., Jr., 4,089,802, Cl. 252-316.000.
Simmons, Gerald P.; Brubaker, Hiram A.; Streight, William E.; and Brown, Robert W., 4,089,595, Cl. 350-294.000.

Brown, Roy R.; and Rilea, Bernard A. Fireplace for mobile home. 4,089,320, Cl. 126-121.000.

Brown, Wilburn Kelly, to Pettibone Corporation. Selectively pressurized tank for hydraulic fluid. 4,089,621, Cl. 417-118.000.

Brubaker, Hiram A.: *See—*
Simmons, Gerald P.; Brubaker, Hiram A.; Streight, William E.; and Brown, Robert W., 4,089,595, Cl. 350-294.000.

Brulfert, Andre. Boiler or vapor generator using catalytic combustion of hydrocarbons. 4,089,303, Cl. 122-250.00R.

Bruschi, Barbara Jungfleisch, to Eastman Kodak Company. Compositions for the detection of hydrogen peroxide. 4,089,747, Cl. 195-99.000.

Brynko, Carl; and Grzech, Stephen P., to Reprographic Materials, Inc. Manifold receptor sheets and processes therefor. 4,089,547, Cl. 282-27.500.

Buchan, William A.; and an der Heiden, Rainer E., to BASF Aktiengesellschaft. Electronic time base error correction methods and arrangements. 4,090,215, Cl. 358-8.000.

Buckley, Thomas Francis; and Gleason, John Gerald, to SmithKline Corporation. 7-Acylamino-8-oxo-3-oxa-1-azabicyclo[4.2.0]octane-2-carboxylic acid derivatives and bactericidal compositions and use thereof. 4,089,956, Cl. 424-248.530.

Budzich, Tadeusz. Load responsive valve assemblies. 4,089,167, Cl. 60-427.000.

Budzich, Tadeusz. Load responsive fluid control valves. 4,089,168, Cl. 60-427.000.

Budzich, Tadeusz. Load responsive fluid control valves. 4,089,346, Cl. 137-596.130.

Bullivant, Kenneth W., to K-tron Corporation. Constant belt tensioner. 4,089,407, Cl. 198-815.000.

Bulmer, Robert J.; and Parssinen, Edwin J., to United States of America, Navy. Underwater acoustic pressure release reflector. 4,090,171, Cl. 340-8.0FT.

Bundesen, Lorenz: *See—*
Brettschneider, Johannes; Bianchi, Valerio; Bejerman, Osvaldo; Bundesen, Lorenz; and Zeller, Hans, 4,089,311, Cl. 123-119.0EC.

Bundy, Gordon L., to Upjohn Company, The. ω-aryl-9-deoxy-PGF compounds. 4,089,878, Cl. 260-408.000.

Bunker Ramo Corporation: *See—*
Pechard, Lucien Leon; and Logerot, Bernard Andre, 4,089,577, Cl. 339-18.00P.

Burch, Lyndon W., to B/K Patent Development, Inc. Switch structure and calibration technique. 4,090,166, Cl. 337-360.000.

Burrows, John: *See—*
Harris, Arthur; Burrows, John; and Jones, Thomas Ivor, 4,089,796, Cl. 252-181.000.

Burtis, Eric F.; and Lien, Ming T., to Burtis, Eric F. Arithmetic training apparatus. 4,089,124, Cl. 35-31.00C.

Burvell Canada Company Limited: *See—*
Brookman, Donald, 4,089,665, Cl. 55-457.000.

Bush, Elmer W. Crankcase emission separator and collector. 4,089,309, Cl. 123-119.00B.

Bussjager, Rudy C.: *See—*
Bell, William W., Jr.; and Bussjager, Rudy C., 4,089,368, Cl. 165-139.000.

Buysch, Hans-Josef: *See—*
Ziemek, Peter; Raue, Roderich; and Buysch, Hans-Josef, 4,089,901, Cl. 260-570.00D.

Byatt, Dennis William George; and Brown, Harold Thomas, to Marconi Company Limited, The. Imaging device. 4,090,212, Cl. 357-24.000.

Byrnes, Robert J. Advertising display. 4,089,130, Cl. 40-613.000.

Byrum, Bernard W., Jr., to Owens-Illinois, Inc. Gas discharge display device with protected dielectric. 4,090,100, Cl. 313-220.000.

C J Wennberg AB: *See—*
Asp, Hans Eskil, 4,089,781, Cl. 210-67.000.

Cage, John M.; Shaw, Robert F.; and Stoft, Paul E., to Shaw, Robert F. Electrically heated surgical cutting instrument and method of using the same. 4,089,336, Cl. 128-303.100.

Cahn, Robert P., to Exxon Research & Engineering Co. Thermal energy storage by means of reversible heat pumping. 4,089,744, Cl. 176-87.000.

California Institute of Technology: *See—*
Maserjian, Joseph; Chern, Shy Shiun; and Li, Seung P., 4,090,213, Cl. 357-30.000.

Calle, Jaime: *See—*
Twibell, Jerome J.; Griswold, Victor Michael; and Calle, Jaime, 4,090,239, Cl. 364-200.000.

Campbell, J. Les, to Aluminum Plumbing Fixture Corp. Combination fixture with swing-out lavatory. 4,089,073, Cl. 4-3.000.

Campbell, Robert W.: *See—*
Edmonds, James T., Jr.; and Campbell, Robert W., 4,089,847, Cl. 260-79.100.

Campbell, Russell J.: *See—*
Stott, Michael A.; and Campbell, Russell J., 4,090,036, Cl. 179-15.0BY.

Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
Stott, Michael A.; and Campbell, Russell J., 4,090,036, Cl. 179-15.0BY.

Canada Wire and Cable Limited: *See—*
Dudley, Michael A., 4,089,765, Cl. 204-180.00R.

Cannata, Robert Frank: *See—*
Brockman, William Harry; and Cannata, Robert Frank, 4,089,589, Cl. 350-162.0SF.

Canon Kabushiki Kaisha: *See—*
Hokkanji, Sakae; Shimizu, Masami; Sunouchi, Akio; Iura, Yukio; Yamamichi, Masayoshi; and Watanabe, Yoshiaki, 4,089,483, Cl. 242-71.400.
Ito, Yoshio; Katayama, Hajime; Nitanda, Hiroshi; and Yamaguchi, Masaru, 4,089,600, Cl. 355-3.0CH.
Mashimo, Yukio; and Ito, Tadashi, 4,090,207, Cl. 354-23.00D.
Shinoda, Nobuhiko; Ito, Tadashi; Nakamoto, Soichi; and Ito, Fumio, 4,090,208, Cl. 354-38.000.

Canton Textile Mills: *See—*
Llach, Lawrence; and Picas, Arturo, 4,089,232, Cl. 74-230.17F.

Cantrell, Ben H., to United States of America, Navy. Monopulse, fan-beam, search-radar system with improved height and azimuth determination. 4,090,197, Cl. 343-16.00M.

Cantwell, John Burnett: *See*—
Dart, Edward Charles; Cantwell, John Burnett; Traynor, James Rodney; Jaworzyn, Joseph Franciszek; and Nemeck, Jozef, 4,089,763, Cl. 204-159.230.

Canty, Eugene T.; Tow, Russell P.; Spayth, Frank J.; Morrow, Richard A.; and Smith, Charlie B., to General Motors Corporation. Passive reflectance modulator. 4,090,198, Cl. 343-18.00D.

Carbonell, Jose; Hasler, Rolf; and Walliser, Roland, to Sandoz Ltd. Method and apparatus for regulating the rate of dye adsorption by the number of dye liquor cycles. 4,089,644, Cl. 8-1.00R.

Carden, John, to Gimda, Inc. Cutter chains having picks and to picks therefor. 4,089,561, Cl. 299-83.000.

Cardone, Michele; Grandini, Angelo; and Zaramella, Bruno. Magnetic anchoring apparatus. 4,090,162, Cl. 335-289.000.

Carl Schenck AG, Firma: *See*—
Altwein, Michael, 4,090,244, Cl. 364-603.000.

Carl Zeiss Stiftung: *See*—
Glatzel, Erhard; and Zajadatz, Heinz, 4,089,591, Cl. 350-214.000.

Carlo Erba S.p.A.: *See*—
Gandolfi, Carmelo; Doria, Gianfederico; and Gaio, Pietro, 4,089,896, Cl. 260-514.00D.

Carlow, Earl F.: *See*—
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,090,236, Cl. 364-200.

Carlson, Allen J.: *See*—
Patel, Kishor J.; and Carlson, Allen J., 4,089,252, Cl. 91-49.000.

Carlson, Curtis E.; Johnson, Richard A.; and Spignese, Edward E., to Raytheon Company. Digital signal processor. 4,090,250, Cl. 364-900.000.

Carlyle, John M.: *See*—
Scott, William R.; and Carlyle, John M., 4,089,224, Cl. 73-587.000.

Carr, Lawrence J., to Borg-Warner Corporation. 2,2,2-Tris(hydroxymethyl)ethylphosponic acid and method for its preparation. 4,089,893, Cl. 260-502.40R.

Carrier Corporation: *See*—
Bell, William W., Jr.; and Bussjager, Rudy C., 4,089,368, Cl. 165-139.000.

Carsten, Bengt Erik: *See*—
Mattsson, Hjalmar Egon; Severinsson, Lars Magnus; and Carsten, Bengt Erik, 4,089,994, Cl. 427-140.000.

Carter, Earnest Ray. Wire dispensing apparatus. 4,089,486, Cl. 242-129.000.

Carter, John L., to United States of America, Army. Constant current charging circuits for high energy modulators. 4,090,140, Cl. 328-65.000.

Cartwright, David: *See*—
Brown, Michael Joseph; Cartwright, David; Collins, David John; and White, Brian Graham, 4,089,674, Cl. 71-94.000.

Casio Computer Co., Ltd.: *See*—
Kashio, Toshio, 4,089,156, Cl. 58-39.500.

Cassano, James R.: *See*—
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,089,515, Cl. 271-3.000.

Caterpillar Tractor Co.: *See*—
Babbitt, John H., Jr., 4,089,613, Cl. 403-388.000.
Dearlove, William E.; and Engelking, Frederick S., 4,089,439, Cl. 222-167.000.
Goloff, Alexander, 4,089,306, Cl. 123-32.00K.
Henson, Ralph B.; and Wiggins, Noel D., 4,089,234, Cl. 74-569.000.
Johnson, Howard L., 4,089,170, Cl. 60-445.000.
Roley, Robert D.; and Sturges, James R., 4,089,531, Cl. 277-92.000.
Simmons, Gerald P.; Brubaker, Hiram A.; Streight, William E.; and Brown, Robert W., 4,089,595, Cl. 350-294.000.
Stedman, Robert N., 4,089,431, Cl. 214-146.00R.

Catuma Pty. Ltd.: *See*—
Lapinski, Richard; and Matusjewski, Marian Richard, 4,089,136, Cl. 49-308.000.

Caudill, Donald L.: *See*—
Crankshaw, Michael; Kucheck, Leo; and Caudill, Donald L., 4,089,725, Cl. 156-299.000.

Cebea Osrodek Badawczo-Rozwojowy Przemyslu Budowy Urzadzen Chemicznych: *See*—
Kulig, Stanislaw; Goral, Andrzej; Surkow, Wlodzimierz; Szczepanik, Andrzej; and Szulaczewski, Edward, 4,089,663, Cl. 55-276.000.

Cefilac: *See*—
Gueussier, Andre Louis, 4,089,681, Cl. 75-133.500.

Celanese Corporation: *See*—
Branecky, Anthony J.; and Harris, David W., 4,089,886, Cl. 260-450.000.

Cencel, J. Arthur; Voge, Andrew; and Mullins, Barry W., to Becton, Dickinson Electronics Company. Capacitive key for keyboard. 4,090,229, Cl. 361-288.000.

Centerline Steering Safety Axle Corporation, The: *See*—
Blood, John D.; and Inbody, Melvin R., 4,089,383, Cl. 180-43.00R.

Cerliani, Alberto, to Construzioni Meccaniche Cerliani S.p.A. Bobbin case. 4,089,282, Cl. 112-229.000.

Cerwin, Robert J., to Ethicon, Inc. Package for multistrand surgical sutures. 4,089,409, Cl. 206-63.300.

Ceskoslovenska akademie ved: *See*—
Kalal, Jaroslav; and Svec, Frantisek, 4,089,823, Cl. 260-23.0EP.

Cha, Chang Yul, to Occidental Oil Shale, Inc. In situ retorting with water vaporized in situ. 4,089,375, Cl. 166-261.000.

Chakrawarti, Shekhar: *See*—
Briggs, Eugene C.; Chakrawarti, Shekhar; Wellbaum, William C.; and Shaftner, Robert F., 4,089,642, Cl. 432-222.000.

Chalker, Harold W.: *See*—
Gorham, Jack R.; and Chalker, Harold W., 4,089,423, Cl. 211-64.000.

Chambers, Byron C., to Chemed Corporation. Composition and method for dispersing flocculant polymers. 4,089,831, Cl. 260-29.6SQ.

Champion International Corporation: *See*—
Powell, Mabrin P., 4,089,834, Cl. 260-29.4UA.

Chandler, Franklin Woodrow, Jr. Protective athletic pants hose. 4,089,064, Cl. 2-2.000.

Chandramouli, Pitchaiya: *See*—
Vasishth, Ramesh C.; and Chandramouli, Pitchaiya, 4,089,828, Cl. 260-29.6TA.

Chang, Pei K., to Stauffer Chemical Company. Whipping composition of modified whey protein and additives. 4,089,987, Cl. 426-564.000.

Chapin, Leonard Lee, to Autotronic Controls, Corp. Air flow transducer. 4,089,215, Cl. 73-116.000.

Charles, Barry Graham: *See*—
Collie, Arthur Alexander; Charles, Barry Graham; Barnett, Edward Charles; and Ramshaw, Jack, 4,089,478, Cl. 241-167.000.

Chateau, Georges M., to Societe Nationale Elf Aquitaine (Production). Seal adaptor alignment means and landing tool and method. 4,089,377, Cl. 166-315.000.

Chatterjie, Nithianandа; and Inturrisi, Charles E., to Cornell Research Foundation, Inc. Process for the stereoselective reduction of 6- and 8-keto morphine and morphinan derivatives with formamidinesulfinic acid and compounds obtained thereby. 4,089,855, Cl. 260-285.000.

Chemed Corporation: *See*—
Chambers, Byron C., 4,089,831, Cl. 260-29.6SQ.

Chen, Li Fu: *See*—
Tsao, George T.; and Chen, Li Fu, 4,090,022, Cl. 536-57.000.

Chen, Tien Chi; Tung, Chin; and Lum, Vincent Y., to International Business Machines Corporation. Apparatus for sorting records in overlap relation with record loading and extraction. 4,090,249, Cl. 364-900.000.

Chern, Shy Shiun: *See*—
Maserjian, Joseph; Chern, Shy Shiun; and Li, Seung P., 4,090,213, Cl. 357-30.000.

Cherry, Kenneth F. Conforming grip glove. 4,089,070, Cl. 2-161.00A.

Chevron Research Company: *See*—
Adams, John Howard, 4,089,790, Cl. 252-18.000.
Lowe, Warren, 4,089,792, Cl. 252-32.70E.

Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt.: *See*—
Meszaros, Zoltan; Knoll, Jozsef; Hermecz, Istvan; Simon, Piroska; Szentmiklosy, Peter; Vasvari, Lelle; Horvath, Agnes; Horvath, Gabor; and Dvortsak, Peter, 4,089,858, Cl. 260-295.00R.

Chiyomaru, Isao: *See*—
Sugiyama, Hironari; Chiyomaru, Isao; Okuda, Itsuki; Yamamoto, Hisaaki; and Ito, Hideo, 4,089,964, Cl. 424-270.000.

Christo, Christ, to Masco Corporation of Indiana. Mixing valve anti-scald apparatus. 4,089,347, Cl. 137-625.410.

Christophliemk, Peter; Worms, Karl-Heinz; and Schreiber, Gerald, to Henkel Kommanditgesellschaft auf Aktien; and Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of low-iron zeolitic aluminosilicates. 4,089,929, Cl. 423-118.000.

Chutter, Raymond Allen; Green, Paul James; Hofmann, Robert Lee; and Long, Daniel Rose, to Procter & Gamble Company, The. Collapsible co-dispensing tubular container. 4,089,437, Cl. 222-94.000.

Ciarniello, Giorgio: *See*—
Comastri, Mauro; and Ciarniello, Giorgio, 4,090,202, Cl. 343-713.000.

Ciba-Geigy AG: *See*—
Mockli, Peter, 4,089,647, Cl. 8-7.000.

Ciba-Geigy Corporation: *See*—
Blackburn, John Bryce; and Field, Arnold William, 4,089,699, Cl. 106-308.00Q.
Falk, Robert A., 4,089,804, Cl. 252-355.000.
Gosteli, Jacques; Storni, Angelo; and Zust, Armin, 4,089,960, Cl. 424-266.000.
Harris, Arthur; Burrows, John; and Jones, Thomas Ivor, 4,089,796, Cl. 252-181.000.
Haug, Theobald; Kiefer, Jurg; Ruf, Peter; and Schmitter, Andre, 4,089,845, Cl. 260-78.00A.
Massy, Derek James Rowland; and Winterbottom, Kenneth, 4,089,827, Cl. 260-29.40R.
Moss, Noel Sydney; and Small, Michael Peter, 4,089,826, Cl. 260-29.2EP.
Petitpierre, Jean Claude, 4,089,546, Cl. 282-27.500.
Ramey, Chester E.; and Luzzi, John J., 4,089,842, Cl. 260-45.75C.
Schneider, Peter; and Bickel, Hans, 4,089,955, Cl. 424-246.000.

Ciko, John D.; Cramer, John J.; and Jamieson, Geoffrey A., to BASF Wyandotte Corporation. Compositions for souring and softening laundered textile materials, method of preparing the same, and stock solutions prepared therefrom. 4,089,786, Cl. 252-8.800.

Cisney, Merle E.; and Lasater, Neil J., to Crown Zellerbach Corporation. Process for selectively producing high-yield, high-purity 4,4-substituted diaryl sulfones. 4,089,904, Cl. 260-607.0AR.

Citizen Watch Company Limited: *See*—
Aoki, Ryozo, 4,089,161, Cl. 59-80.000.
Yoshida, Makoto, 4,089,159, Cl. 58-152.00R.

Ciuci, Richard W. Decorative toilet tissue enclosure. 4,089,481, Cl. 242-55.530.

Clark Equipment Company: *See*—
Visser, Peter J., 4,089,253, Cl. 92-168.000.

Clegg, Maurice A.: *See*—
McMullen, Arthur G.; Ruscoe, Michael J. H.; Clegg, Maurice A.; and Prowse, Ronald L., 4,089,753, Cl. 204-23.000.

Coates, Roger Hampton; and Gillan, John, to Dulux Australia Limited.

Process of preparing vesiculated polyester resin granules. 4,089,819, Cl. 260-2.50N.
Coats, Alma L.: *See—*
Simpson, Vernon P.; and Coats, Alma L., 4,089,645, Cl. 8-4.000.
Cohen, Alfred L.: *See—*
Ettelt, Gregory A.; and Cohen, Alfred L., 4,089,784, Cl. 210-526.000.
Cohen, Claude, to Aron Sarl. 5-N-(3-Amino-2-hydroxy-propyl)-amino-1,2,4-oxadiazole derivatives, processes for their preparation and applications thereof. 4,089,966, Cl. 424-272.000.
Cohen, Georges: *See—*
Rojey, Alexandre; and Cohen, Georges, 4,089,186, Cl. 62-101.000.
Cohen, Liuba: *See—*
Greidinger, Dahlia Simeona; and Cohen, Liuba, 4,089,899, Cl. 260-553.00R.
Cole, Edward L., to Texaco Inc. Treatment of solid fuels. 4,089,656, Cl. 44-1.00R.
Cole, John M.; and Cole, Ruth E. Portable manually operated duster. 4,089,441, Cl. 222-193.000.
Cole, Ruth E.: *See—*
Cole, John M.; and Cole, Ruth E., 4,089,441, Cl. 222-193.000.
Colgate-Palmolive Company: *See—*
Gerecht, John Fred, 4,089,868, Cl. 260-308.00B.
Roberts, Francis D.; and Steinke, John J., III, 4,089,943, Cl. 424-49.000.
Colglazier, Donald Francis; Fallon, John Leslie; Kollar, Ernest Paul; and Mares, Fred Ralph, to International Business Machines Corporation. Multibin, cut-sheet xerographic copier. 4,089,516, Cl. 271-9.000.
Collender, Robert Bruce. Stereoscopic motion picture scanning reproduction method and apparatus. 4,089,597, Cl. 352-53.000.
Collie, Arthur Alexander; Charles, Barry Graham; Barnett, Edward Charles; and Ramshaw, Jack, to Kenwood Manufacturing Company Limited. Seed mill. 4,089,478, Cl. 241-167.000.
Collins, David John: *See—*
Brown, Michael Joseph; Cartwright, David; Collins, David John; and White, Brian Graham, 4,089,674, Cl. 71-94.000.
Collins, William J. Device and method of obtaining a sample of liquid. 4,089,223, Cl. 73-425.40R.
Colomes, Jacques, to Commissariat a l'Energie Atomique. Solar pointer. 4,090,070, Cl. 250-203.00R.
Comastri, Mauro, to Societe Italiana Vetro SIV SpA. Glass plate bending procedure. 4,089,668, Cl. 65-104.000.
Comastri, Mauro; and Ciarniello, Giorgio, to Societa Italiana Vetro SIV S.p.A. Multiband antenna for automobile windshield. 4,090,202, Cl. 343-713.000.
Combustion Engineering, Inc.: *See—*
Smith, Donald Arthur; and Horan, David Joseph, 4,089,637, Cl. 431-183.000.
Wyvill, Jeffrey Roland, 4,090,083, Cl. 250-390.000.
Comley, William: *See—*
Anderson, Alvin M.; Comley, William; and Engum, Douglas B., 4,089,494, Cl. 244-178.000.
Commissariat a l'Energie Atomique: *See—*
Colomes, Jacques, 4,090,070, Cl. 250-203.00R.
Falgari, Jean Paul; Perdijon, Jean; and Voituriez, Bernard, 4,089,227, Cl. 73-622.000.
Communications Patents Limited: *See—*
Gargini, Eric John, 4,090,220, Cl. 358-86.000.
Compagnie Electro-Mecanique: *See—*
Sterlini, Jacques, 4,089,660, Cl. 55-93.000.
Compagnie Francaise de Produits Industriels: *See—*
Askienazy, Alexandre; Ken, Victor; and Souchet, Jean-Claude, 4,089,708, Cl. 148-6.15R.
Compagnie Honeywell Bull (Societe Anonyme): *See—*
Hauchart, Jean Lucien Alexandre, 4,090,154, Cl. 333-32.000.
Compagnie Industrielle des Telecommunications Cit-Alcatel S.A.: *See—*
Sinobad, Dusan, 4,090,260, Cl. 365-237.000.
Comprotek, S. A.: *See—*
Hofmann, Rudolf, Jr., 4,089,625, Cl. 417-440.000.
Congoleum Corporation: *See—*
Barchi, Henry J., 4,089,296, Cl. 118-413.000.
Conlin, Donald B.: *See—*
Bernecker, Gunther, 4,089,314, Cl. 123-133.000.
Connor, Denis John, to Bell Telephone Laboratories, Incorporated. Apparatus for improving video signal-to-noise ratio. 4,090,221, Cl. 358-166.000.
Conrac Corporation: *See—*
Lagasse, Eugene F., 4,090,030, Cl. 174-153.00A.
Conrow, Ransom Brown; Poletto, John Frank; and Bernstein, Seymour, to American Cyanamid Company. 5-Carboxy-phenylenebis(-carbonylimino)benzene carboxylic and dicarboxylic acids and salts. 4,089,974, Cl. 424-319.000.
Constable, Douglas W., to GTE Sylvania Incorporated. Ambient light contrast and color control circuit. 4,090,216, Cl. 358-21.000.
Construzioni Meccaniche Cerliani S.p.A.: *See—*
Cerliani, Alberto, 4,089,282, Cl. 112-229.000.
Container Corporation of America: *See—*
Gardner, Jeffrey M., 4,089,411, Cl. 206-300.000.
Contractor, Rashmikant Maganlal; and Hwang, Sang-Hak, to Du Pont de Nemours, E. I., and Company. Air lay-down process for producing uniform lightweight webs from textile fibers. 4,089,086, Cl. 19-305.000.
Conwed Corporation: *See—*
Hillman, Theodore Eugene, 4,089,740, Cl. 162-304.000.
Slocumb, Robert C., 4,089,818, Cl. 260-2.5HA.
Cook, Harold D., to Edko Manufacturing Company. Adjustable ratcheting wheel hub. 4,089,387, Cl. 180-76.000.
Cooke, Brian Alfred, to Imperial Chemical Industries Limited. Phosphating method with control in response to conductivity change. 4,089,710, Cl. 148-6.15Z.
Cooke, Horise M.: *See—*
Vyse, Gerrard N.; and Cooke, Horise M., 4,089,549, Cl. 285-137.00R.
Cooper Laboratories, Inc.: *See—*
Diamond, Julius, 4,089,959, Cl. 424-253.000.
Copal Company Limited: *See—*
Okabe, Katsuhiko; and Sudo, Yoshiyuki, 4,089,263, Cl. 101-93.330.
Corbett, Luke W., to Exxon Research & Engineering Co. Process for handling asphaltene concentrates. 4,089,698, Cl. 106-278.000.
Cornell Research Foundation, Inc.: *See—*
Chatterjie, Nithiananda; and Inturrisi, Charles E., 4,089,855, Cl. 260-285.000.
Corompt, Antoine, to Bennes Marrel. Transportation equipment. 4,089,435, Cl. 214-304.000.
Cosden Technology, Inc.: *See—*
Watson, James M., 4,089,859, Cl. 544-353.000.
Coulter Electronics, Inc.: *See—*
Simpson, Ronald O.; Starling, J. David; James, Bobby D.; Godin, Thomas John; Ginsberg, Guenter; and Drbal, Vladimir J., 4,090,128, Cl. 324-71.0CP.
Couvillon, Lucien Alfred, Jr.; Grover, Thomas Reaks; Baker, Charles Dewitt; and Topham, William Sanford, to University of Utah Research Institute. Noninvasive, continuous intraocular pressure monitor. 4,089,329, Cl. 128-2.00T.
Cox, Lamar: *See—*
Bell, William W., III; Cox, Lamar; and Rubin, William L., 4,090,067, Cl. 250-199.000.
Craig, Robert W. Watercraft. 4,089,291, Cl. 115-70.000.
Cramer, John J.: *See—*
Ciko, John D.; Cramer, John J.; and Jamieson, Geoffrey A., 4,089,786, Cl. 252-8.800.
Cranberg, Lawrence, to TDN, Inc. Method and apparatus for generating neutrons. 4,090,086, Cl. 250-499.000.
Crankshaw, Gary K.; and Braymer, George W., to Upjohn Company, The. Vial and closure. 4,089,432, Cl. 215-6.000.
Crankshaw, Michael; Kucheck, Leo; and Caudill, Donald L., to Label-Aire Inc. Apparatus and method for transmitting elements to articles. 4,089,725, Cl. 156-299.000.
Cremeans, George E.: *See—*
Luttinger, Manfred; Cremeans, George E.; and Nowacki, Louis J., 4,089,837, Cl. 260-38.000.
Cremona, Angelo. Wood shearing machine. 4,089,354, Cl. 144-178.000.
Cricchi, James R., to Westinghouse Electric Corp. MNOS non-volatile memory with write cycle suppression. 4,090,258, Cl. 365-184.000.
Crockett, Charles R.: *See—*
Walker, Jerry L.; and Crockett, Charles R., 4,090,167, Cl. 338-172.000.
Croon & Lucke Maschinenfabrik GmbH & Co. KG: *See—*
Lucke, Florian, 4,089,479, Cl. 242-2.000.
Crosland Filters Limited: *See—*
Holyoak, Kenneth, 4,089,783, Cl. 210-358.000.
Crouzet: *See—*
Presset, Rene; and Torregrosa, Michel, 4,090,151, Cl. 331-66.000.
Crowley, Richard P. Embossed plastic surface covering and method of preparing same. 4,090,007, Cl. 428-159.000.
Crown Cork & Seal Company, Inc.: *See—*
Antonelli, Mario Eduardo, 4,089,353, Cl. 141-302.000.
Crown Zellerbach Corporation: *See—*
Cisney, Merle E.; and Lasater, Neil J., 4,089,904, Cl. 260-607.0AR.
Crownover, Frederick S. Glove and tool device. 4,089,379, Cl. 172-370.000.
Cudmore, Patrick J., to Wave-Rider, Incorporated. Microscope. 4,089,592, Cl. 350-235.000.
Cuffiani, Illaro: *See—*
Zucchini, Umberto; and Cuffiani, Illaro, 4,089,808, Cl. 252-429.00C.
Cumbach, James Stephen: *See—*
Phillips, Alvin Carson; and Cumbach, James Stephen, 4,090,062, Cl. 219-486.000.
Cummisford, Robert G.; Wasielewski, Richard J.; and Krueger, Robert K., to Krause Milling Company. Method for manufacturing foundry cores. 4,089,691, Cl. 106-38.400.
Curtiscorp, Inc.: *See—*
Makowicki, James M., 4,089,467, Cl. 220-334.000.
Cushing, Vincent J. Electromagnetic water current meter with staggered stick out electrodes. 4,089,218, Cl. 73-189.000.
Czerner, Peter Alfred; and Marchetti, Michael John, to Sperry Rand Corporation. Cutter head assembly. 4,089,109, Cl. 30-34.100.
Daffron, Vernon M., to Wagner Electric Corporation. Point sensor mounting apparatus. 4,090,099, Cl. 310-168.000.
Dahl, Warren F.; and Landt, Richard C., to Standard Pressed Steel Co. Blind fastener. 4,089,247, Cl. 85-70.000.
Dahlberg Industries: *See—*
Blake, A. Webster, 4,089,270, Cl. 104-130.000.
Dai Nippon Toryo Co., Ltd.: *See—*
Shimiya, Keiji; Miura, Norio; Takano, Masao; and Ishigaki, Kunio, 4,090,085, Cl. 250-483.000.
Daimler-Benz Aktiengesellschaft: *See—*
Forster, Hans-Joachim M.; Zaiser, Wolfgang; and Hensel, Werner, 4,089,238, Cl. 74-759.000.
Daniele, Giuliano: *See—*
Stradella, Giuseppe; Stradella, Umberto; Daniele, Giuliano; and Gatti, Fernando, 4,089,342, Cl. 137-102.000.

Danin, Boris Konstantinovich: *See—*
Kamyshnikov, Arkady Ivanovich; Rutitsky, Alexandr Isaakovich; Speransky, Vladimir Mikhailovich; and Danin, Boris Konstantinovich, 4,089,532, Cl. 277-129.000.

Darragh, John Irvine, to Imperial Chemical Industries Limited. Process for producing pyridine and methyl pyridines. 4,089,863, Cl. 260-290.00P.

Dart, Edward Charles; Cantwell, John Burnett; Traynor, James Rodney; Jaworzyn, Joseph Franciszek; and Nemeck, Jozef, to Imperial Chemical Industries Limited. Method of repairing teeth using a composition which is curable by irradiation with visible light. 4,089,763, Cl. 204-159.230.

Davey Tree Expert Company, The: *See—*
Funk, Roger Calvin, 4,089,670, Cl. 71-29.000.

DDSA Pharmaceuticals: *See—*
Shenoy, Umakant Devdas, 4,089,953, Cl. 424-244.000.

Dean, Warren E.: *See—*
Milam, Joseph E.; Dean, Warren E.; and Gerdes, Robert K., 4,089,909, Cl. 260-650.00R.

Dearlove, William E.; and Engelking, Frederick S., to Caterpillar Tractor Co. Apparatus for discharging fibers from between the convolutions of a coiled web. 4,089,439, Cl. 222-167.000.

DEC International, Inc.: *See—*
Hazen, Gretz L., 4,089,243, Cl. 83-161.000.

Decuir, Perry J., Sr. Production shoe. 4,089,371, Cl. 166-242.000.

de Jonge, Jelis: *See—*
Lefeber, Jan; and de Jonge, Jelis, 4,089,093, Cl. 29-25.420.

de Labbey, Arnaud: *See—*
Bore, Pierre; Arnaud, Jean-Claude; and de Labbey, Arnaud, 4,089,942, Cl. 424-47.000.

DeLaval Turbine Inc.: *See—*
Raymond, Robert E., 4,089,503, Cl. 251-65.000.

DeMarco, Charles C. Prying machine for dismantling pallets and the like. 4,089,098, Cl. 29-239.000.

de Mattos, Jorge Jose, to Posta, John J., Jr., a part interest. Seat device. 4,089,560, Cl. 297-441.000.

Denka Chemical Corporation: *See—*
Smith, Lawrence A., Jr., 4,089,751, Cl. 203-74.000.

Denmar, Stephen A.: *See—*
Kirkendall, Dennis, 4,089,817, Cl. 343-713.000.

Denton, Norman; and Harding, Andrew Baxter, to International Standard Electric Corporation. Rotary gas seal. 4,089,550, Cl. 285-276.000.

Dentsu Central Kabushiki Kaisha: *See—*
Kaneyasu, Masao, 4,090,044, Cl. 179-185.000.

DeSoto, Inc.: *See—*
Aeschliman, Eugene, 4,089,573, Cl. 312-27.000.

Dethman, Margaret L. Fingernail protector. 4,089,066, Cl. 2-21.000.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Christophliemk, Peter; Worms, Karl-Heinz; and Schreiber, Gerald, 4,089,929, Cl. 423-118.000.
Giesselmann, Gunter; Schreyer, Gerd; and Vanheertum, Rudolf, 4,089,887, Cl. 260-454.000.
Merk, Wolfgang; Schreyer, Gerd; and Weigel, Horst, 4,090,024, Cl. 548-309.000.

Deutsche Gold-und Silberscheideanstalt Vormals Roessler: *See—*
Hofen, Willi; Schreyer, Gerd; Wirthwein, Rolf; Waldmann, Helmut; and Siekmann, Gerd, 4 089,892, Cl. 260-502.00R.

De Villiers, Johan P. R.; and Ormrod, George T. W., to National Institute for Metallurgy. Determination of mineral concentrations in slurries thereof. 4,090,073, Cl. 250-273.000.

DeVries, William S., Jr.; and Malek, Elmer M., to Wm. DeVries & Sons, Inc. Metal roof construction. 4,089,145, Cl. 52-461.000.

Dezawa, Shin-ichiro: *See—*
Shirahata, Ryuji; Suzuki, Masaaki; Yamada, Yasuyuki; Kitamoto, Tatsuji; and Dezawa, Shin-ichiro, 4,089,993, Cl. 427-129.000.

de Zwart, Maarten; and Lathouwers, Theodorus Wilhelmus, to U.S. Philips Corporation. Nematic liquid crystalline mixture of α-cyanostilbenes and application thereof in image display devices. 4,089,588, Cl. 350-350.000.

Diamalt Aktiengesellschaft: *See—*
Habereder, Peter; and Bayerlein, Friedrich, 4,089,646, Cl. 8-7.000.

Diamond International Corporation: *See—*
Keen, Everett M.; and Siciliano, Anthony J., 4,089,300, Cl. 119-52.0AF.

Diamond, Julius, to Cooper Laboratories, Inc. Long-acting xanthine bronchodilators and antiallergy agents. 4,089,959, Cl. 424-253.000.

Diamond Shamrock Corporation: *See—*
Papalos, John George, 4,089,894, Cl. 260-507.00R.

DiCesare, Sam: *See—*
Swanson, James R.; DiCesare, Sam; and Barthel, Richard C., 4,090,248, Cl. 364-900.000.

Dickson, John Flackett: *See—*
Wilcock, John David; and Dickson, John Flackett, 4,090,259, Cl. 365-191.000.

Dictaphone Corporation: *See—*
Whitney, James C., 4,089,489, Cl. 242-204.000.

Didier Engineering GmbH: *See—*
Steimann, Franz; and Nagorny, Claus, 4,089,424, Cl. 212-4.000.

Dietrich, Manfred: *See—*
Konig, Klaus; and Dietrich, Manfred, 4,089,835, Cl. 260-31.600.

Dietrich, Ralph Nowack, to Kimball International, Inc. Break generator. 4,089,245, Cl. 84-1.030.

Diimmler, Glen F.: *See—*
Fuller, Frederick B.; Orosz, Miklos J.; Williams, Richard H., Jr.; and Diimmler, Glen F., 4,090,230, Cl. 361-345.000.

Dimmick, James Owen, to Bell Telephone Laboratories, Incorporated. Processor circuit. 4,090,237, Cl. 364-200.000.

Director-General of the Agency of Industrial Science & Technology: *See—*
Morita, Yazaemon; Kogure, Yukitoshi; and Nomura, Akira, 4,089,932, Cl. 423-338.000.
Yamauchi, Aizo; and Watanabe, Yasushi, 4,089,832, Cl. 260-29.6WA.

Disney, Ralph W.: *See—*
Reynolds, Merrill J.; and Disney, Ralph W., 4,089,373, Cl. 166-256.000.

Disston, Inc.: *See—*
Doolittle, Stephen Dale; Lineback, Lynn David; Sherrill, Charles Franklin; Stanfield, Willie Lonnie, Jr.; and Wildman, Kelvin Howard, 4,089,114, Cl. 30-276.000.

Diwell, Alan Francis; and Evans, William David James, to Johnson, Matthey & Co., Limited. Catalyst. 4,089,810, Cl. 252-462.000.

Dobo, Emerick J., to Monsanto Company. Process for sintered bi-metallic filamentary composites. 4,089,921, Cl. 264-63.000.

Doehler, Peter: *See—*
Baumgartner, Erich Rudolf; and Doehler, Peter, 4,089,128, Cl. 38-93.000.

Dokter, Heinz: *See—*
Hess, Otto; Dokter, Heinz; and Scherzinger, Werner, 4,089,279, Cl. 112-121.120.

Dolgy, Alexei Arsentievich: *See—*
Lipets, Adolf Usherovich; Moskvichev, Viktor Fedorovich; Katyshev, Georgy Viktorovich; Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Shamarokova, Raisa Nikiforovna; Dolgy, Alexei Arsentievich; Eletsky, Stanislav Alexandrovich; Grinberg, Yakov Natanovich; Ardamatsky, Vitaly Andreevich; Vivsik, Svyatoslav Nikolaevich; Zavedeev, Vasily Evdokimovich; Zevin, Ilya Julievich; and Fadeev, Evgeny Alexeevich, 4,089,369, Cl. 165-158.000.

Dominion Engineering Works Limited: *See—*
Koeller, Paul, 4,089,617, Cl. 415-163.000.

Donahue, John W.: *See—*
Huffman, Harold W.; Lyon, Richard H.; Holmes, David G.; and Donahue, John W., 4,090,205, Cl. 346-75.000.

Doo, Ven Y.; Nichols, Donald R.; and Silvey, Gene A., to International Business Machines Corporation. Method for depositing continuous pinhole free silicon nitride films and products produced thereby. 4,089,992, Cl. 427-94.000.

Doolittle, Stephen Dale; Lineback, Lynn David; Sherrill, Charles Franklin; Stanfield, Willie Lonnie, Jr.; and Wildman, Kelvin Howard, to Disston, Inc. Cutting device. 4,089,114, Cl. 30-276.000.

Doria, Gianfederico: *See—*
Gandolfi, Carmelo; Doria, Gianfederico; and Gaio, Pietro, 4,089,896, Cl. 260-514.00D.

Dover Corporation: *See—*
Hill, Homer; and Dunn, Alfred L., 4,089,626, Cl. 417-431.000.

Dow Chemical Company, The: *See—*
Gurley, Derrel G., 4,089,548, Cl. 285-3.000.
Klingler, Thomas C.; Schmidt, Donald L.; Jensen, Warner, Jr.; and Urchick, Demetrius, 4,089,877, Cl. 260-332.30R.
Wade, Lisby Lucius; and McDermott, Muriel, 4,089,975, Cl. 424-322.000.

Dowa Co., Ltd.: *See—*
Miyahara, Kingo, 4,089,982, Cl. 426-107.000.

Downing, Anthony Peter: *See—*
Rees, John Michael; Horler, Christopher Arthur; and Downing, Anthony Peter, 4,090,101, Cl. 313-223.000.

Dragerwerk Aktiengesellschaft: *See—*
Heim, Ulrich, 4,090,078, Cl. 250-343.000.

Drbal, Vladimir J.: *See—*
Simpson, Ronald O.; Starling, J. David; James, Bobby D.; Godin, Thomas John; Ginsberg, Guenter; and Drbal, Vladimir J., 4,090,128, Cl. 324-71.0CP.

Dresser Industries, Inc.: *See—*
Stratienko, Andrew, 4,089,398, Cl. 192-114.00R.

Drews, Ulrich; Winkelmann, Lothar; and Schnurle, Hans, to Robert Bosch GmbH. Apparatus for mixture enrichment in an internal combustion engine. 4,089,317, Cl. 123-179.00L.

Droz, Daniel M. Internal hinge. 4,089,084, Cl. 16-128.00R.

Druschke, Wolfgang: *See—*
Bronstert, Klaus; Ladenberger, Volker; Druschke, Wolfgang; Groh, Wolfgang; and Mueller, Helmut, 4,089,824, Cl. 260-27.0BB.

DSO "Balkankar": *See—*
Mishev, Georgi Nikolov; and Haralampiev, Iliya Stoilkov, 4,089,627, Cl. 425-303.000.

Du Pont of Canada Limited: *See—*
Bell, Albert; Boocock, John Roger Brooke; and Oughton, Richard Walton, 4,089,848, Cl. 260-112.00R.

Dubost, Rene; and Grenat, Bernard, to Les Cables de Lyon S.A. Taping device, particularly for optical fibres. 4,089,154, Cl. 57-3.000.

Ducane Heating Corporation: *See—*
Berger, Bernard B., 4,089,258, Cl. 99-339.000.

Dudley, Michael A., to Canada Wire and Cable Limited. Electroimpregnation of paper and non-woven fabrics. 4,089,765, Cl. 204-180.00R.

Dueck, Gerhard G. Automatic resaw shake cutter and method. 4,089,355, Cl. 144-309.00R.

Dulux Australia Limited: *See—*
Coates, Roger Hampton; and Gillan, John, 4,089,819, Cl. 260-2.50N.

Duncan, James W., to TRW Inc. Low sidelobe antenna system employing plural spaced feeds with amplitude control. 4,090,203, Cl. 343-753.000.

Duncan, Vinal S. Device for liquid feeding of potted plants and the like. 4,089,133, Cl. 47-48.500.

Dunlop, Andrew P., to Quaker Oats Company, The. Method of manufacturing shell cores and molds. 4,089,363, Cl. 164-16.000.

Dunlop Limited: *See—*
Ware, Peter George; and White, Harold William, 4,089,499, Cl. 248-376.000.

Dunn, Alfred L.: *See—*
Hill, Homer; and Dunn, Alfred L., 4,089,626, Cl. 417-431.000.

Dunne, James, to Engineers & Metalworkers Ltd. Ventilation grille or grating. 4,089,257, Cl. 98-121.00R.

Du Pont de Nemours, E. I., and Company: *See—*
Contractor, Rashmikant Maganlal; and Hwang, Sang-Hak, 4,089,086, Cl. 19-305.000.
Horowitz, Samuel Jacob, 4,090,009, Cl. 428-208.000.
Iwasyk, John Maurice, 4,090,261, Cl. 366-83.000.
Lemke, Charles H., 4,089,770, Cl. 204-247.000.

Duranleau, Roger G.; Larkin, John M.; and Newman, Stanley R., to Texaco Inc. Preparation of diacylfurazan oxides. 4,089,867, Cl. 260-307.00G.

Durant, Graham John; Ganellin, Charon Robin; and White, George Raymond, to Smith Kline & French Laboratories Limited. Certain nitrogen heterocyclic isothiocyanate esters. 4,090,026, Cl. 548-342.000.

Duro-Test Corporation: *See—*
Koo, Ronald C., 4,090,105, Cl. 315-74.000.

Dutra, Gerard A., to Monsanto Company. N,N'-methylenebis-[O,O-diaryl N-phosphonomethylglycinonitriles]. 4,089,671, Cl. 71-86.000.

Dvortsak, Peter: *See—*
Meszaros, Zoltan; Knoll, Jozsef; Hermecz, Istvan; Simon, Piroska; Szentmiklosy, Peter; Vasvari, Lelle; Horvath, Agnes; Horvath, Gabor; and Dvortsak, Peter, 4,089,858, Cl. 260-295.00R.

Dydyk, Michael, to Motorola, Inc. Push-pull oscillator circuit with power combining cavity. 4,090,152, Cl. 331-102.000.

Dynamics Research Corporation: *See—*
Wingate, Sidney A.; and Pacini, Elmo J., 4,089,200, Cl. 72-389.000.

Dynamit Nobel Aktiengesellschaft: *See—*
Naskar, Sasanka Sekhar; Renckhoff, Gustav; Heers, Wolfgang; and Pass, Reinhard, 4,089,879, Cl. 260-410.700.

Easom Engineering & Manufacturing Corporation: *See—*
Obra, Bart R., 4,089,228, Cl. 74-52.000.

Eastman Kodak Company: *See—*
Bissonette, Vernon L., 4,089,685, Cl. 96-22.000.
Bruschi, Barbara Jungfleisch, 4,089,747, Cl. 195-99.000.
Irick, Gether, Jr.; and Kelly, Charles A., 4,089,874, Cl. 260-302.00D.
Siegel, Harris T.; and Olson, James R., 4,089,472, Cl. 241-5.000.

Eastman Technology, Inc.: *See—*
Wright, Charles Edward, 4,090,214, Cl. 358-4.000.

Eastridge, Floyd W. Lowerable step assembly for interior side of hinged doors. 4,089,538, Cl. 280-166.000.

Eberhardt, H. Alfred, to Hale Fire Pump Company. Discharge valve. 4,089,345, Cl. 137-596.200.

Eckel, Emery Lee, to Eckel Manufacturing Co., Inc. Power tongs. 4,089,240, Cl. 81-57.180.

Eckel Manufacturing Co., Inc.: *See—*
Eckel, Emery Lee, 4,089,240, Cl. 81-57.180.

Edko Manufacturing Company: *See—*
Cook, Harold D., 4,089,387, Cl. 180-76.000.

Edmonds, James T., Jr.; and Campbell, Robert W., to Phillips Petroleum Company. Temperature programming in the production of arylene sulfide polymers. 4,089,847, Cl. 260-79.100.

Edwards, Albert, to Baker Perkins Holdings Limited. Manufacture of foundry cores and moulds. 4,089,362, Cl. 164-7.000.

Edwards, John A., to Syntex (U.S.A.) Inc. Certain thiazole compounds. 4,089,865, Cl. 260-302.00H.

Egami, Tsuneyuki; Kawai, Hisasi; Kohama, Tokio; and Obayashi, Hideki, to Nippon Soken, Inc. Intake air amount detecting system. 4,089,214, Cl. 73-116.000.

Ehrenberg, Gustave. Self-propelled land vehicle. 4,089,384, Cl. 180-44.00E.

Ehrenreich Photo-Optical Industries, Inc.: *See—*
Handsman, Frederic B., 4,089,604, Cl. 355-74.000.

Ekstrom, Bertil Ake: *See—*
Bamberg, Peter; Ekstrom, Bertil Ake; and Sjoberg, Berndt Olof Harald, 4,089,963, Cl. 424-270.000.

Elastogran Maschinenbau GmbH & Co.: *See—*
Schneider, Fritz W.; and Grgic, Ivica, 4,090,262, Cl. 366-155.000.

Electro Corporation: *See—*
Brown, Dennis L.; Gee, Gordon E.; and Wilson, Michael A., 4,090,091, Cl. 307-116.000.

Electron Beam Welding, Inc.: *See—*
Lockwood, Herbert C.; and Robelotto, Salvatore M., 4,090,056, Cl. 219-121.0EB.

Eletsky, Stanislav Alexandrovich: *See—*
Lipets, Adolf Usherovich; Moskvichev, Viktor Fedorovich; Katyshev, Georgy Viktorovich; Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Shamarokova, Raisa Nikiforovna; Dolgy, Alexei Arsentievich; Eletsky, Stanislav Alexandrovich; Grinberg, Yakov Natanovich; Ardamatsky, Vitaly Andreevich; Vivsik, Svyatoslav Nikolaevich; Zavedeev, Vasily Evdokimovich; Zevin, Ilya Julievich; and Fadeev, Evgeny Alexeevich, 4,089,369, Cl. 165-158.000.

Eleusis Bauxite Mines-Mining Industrial and Shipping Inc.: *See—*
Foroglou, Zafiris, 4,089,928, Cl. 423-49.000.

Elias, Charles R., to Ex-Cell-O Corporation. Load measurement device. 4,089,216, Cl. 73-136.00R.

Elli, Carlo: *See—*
Bernardi, Luigi; Elli, Carlo; Falconi, Giovanni; and Ferrari, Rosella, 4,089,862, Cl. 260-285.500.

Elliott Brothers (London) Limited: *See—*
Barowitz, Peter Jack; and Baxendale, Roy, 4,090,180, Cl. 340-261.000.

Elliott, Guy R. B.; Holley, Charles E.; Houseman, Barton L.; and Sibbitt, Wilmer L., Jr., to United States of America, Energy. Electrochemical heat engine. 4,090,012, Cl. 429-20.000.

Emerson Electric Co.: *See—*
Milum, Jimmy L., 4,089,661, Cl. 55-137.000.

Encon Systems, Inc.: *See—*
McMahon, Melvin B.; Guth, Lloyd A.; and Thomas, Larry A., 4,090,088, Cl. 307-38.000.

Endo, Masaaki; Miura, Mitsuo; and Kukino, Yoshinori, to Kabushiki Kaisha Takenaka Komuten; and Kabushiki Kaisha Takenaka Doboku. Consolidation construction for improving soft, unstable foundation. 4,089,183, Cl. 61-50.000.

Eng, Jackson: *See—*
Berger, Dietmar; and Eng, Jackson, 4,089,775, Cl. 208-111.000.

Engel, Lawrence J.; and Gardiner, John B., to Exxon Research & Engineering Co. Polymeric additives for fuels and lubricants. 4,089,794, Cl. 252-51.50A.

Engelhard Minerals & Chemicals Corporation: *See—*
Polinski, Leon M.; Roberts, George W.; and Hindin, Saul G., 4,089,654, Cl. 23-288.0FC.

Engelking, Frederick S.: *See—*
Dearlove, William E.; and Engelking, Frederick S., 4,089,439, Cl. 222-167.000.

Engineers & Metalworkers Ltd.: *See—*
Dunne, James, 4,089,257, Cl. 98-121.00R.

Engler, Edward Martin; and Schumaker, Robert Rhees, to International Business Machines Corporation. Tetrathiapentalene and tetraselenapentalene compounds. 4,089,857, Cl. 260-293.560.

Engum, Douglas B.: *See—*
Anderson, Alvin M.; Comley, William; and Engum, Douglas B., 4,089,494, Cl. 244-178.000.

Enkoji, Takashi; and Skibbe, Martin O., to Armour Pharmaceutical Company. Synthesis of peptide amides. 4,089,821, Cl. 260-8.000.

Enoksson, Bertil Petrus; and Eriksson, Lars Uno Lennart, to Nitro Nobel AB. Method of cleaning internal surfaces employing an explosive gas. 4,089,702, Cl. 134-1.000.

Enos, Ernest S. Portable bumper platform. 4,089,276, Cl. 108-44.000.

Ensink, Johann Maria, to Remeha Fabrieken br - The Netherlands. Cast metal heat exchanger, as well as mould therefor. 4,089,302, Cl. 122-225.00R.

Entreprise Industrielle de Chaudronnerie: *See—*
Brola, Gabriel, 4,089,325, Cl. 126-271.000.

Enz, Philip I.: *See—*
Enz, Vera G.; and Enz, Philip I., 4,089,125, Cl. 35-8.00R.

Enz, Vera G.; and Enz, Philip I. Color-assist teaching aid and method therefor. 4,089,125, Cl. 35-8.00R.

Epstein, Heywood Y.; and Famiglietti, Carmine. Mammography compression apparatus. 4,090,084, Cl. 250-439.00R.

Ericsson, Sylve Jack Donald; and Larsson, Karl Georg, to Svecia Silkscreen Maskiner AB. Apparatus for drying ink on freshly printed material. 4,089,123, Cl. 34-155.000.

Eriksson, Lars Uno Lennart: *See—*
Enoksson, Bertil Petrus; and Eriksson, Lars Uno Lennart, 4,089,702, Cl. 134-1.000.

Ermidis, Nicholas Peter: *See—*
Vial, Theodore Merriam; and Ermidis, Nicholas Peter, 4,089,822, Cl. 260-18.0TN.

Ernst Leitz Wetzlar GmbH.: *See—*
Lisfeld, Robert; Nickel, Werner; and Reinheimer, Guenter, 4,090,069, Cl. 250-201.000.

Ernstoff, Michael N.; Hoffman, William C.; and Winner, Richard N., to Hughes Aircraft Company. Liquid crystal sequential color display. 4,090,219, Cl. 358-59.000.

Escher Wyss GmbH: *See—*
Hildebrand, Otto; Link, Christoph; Reutter, Siegfried; and Stotz, Wolf-Gunter, 4,089,739, Cl. 162-343.000.

Espenscheid, Wilton F., to Mobil Oil Corporation. Liquefaction of solid carbonaceous materials. 4,089,773, Cl. 208-8.000.

Estes, John H.: *See—*
Koniz, Leon F.; and Estes, John H., 4,089,811, Cl. 252-463.000.

Etat Francais: *See—*
Melchior, Jean; and Andre, Thierry, 4,089,173, Cl. 60-606.000.

Ethicon, Inc.: *See—*
Cerwin, Robert J., 4,089,409, Cl. 206-63.300.

Ethyl Corporation: *See—*
Hafele, Robert X.; and LoMaglio, Lewis C., 4,089,442, Cl. 222-321.000.
Hornbaker, Edwin D.; Jones, Jesse D.; Kucsma, Michael E.; and Allen, Thomas S., 4,089,838, Cl. 260-40.00R.

Etienne, Guy: *See—*
Mertzweiller nee Maillard, Anne-Marie; and Etienne, Guy, 4,090,001, Cl. 427-444.000.

Ettelt, Gregory A.; and Cohen, Alfred L., to Tenco Hydro/Aerosciences, Inc. Belt type oil removal unit. 4,089,784, Cl. 210-526.000.

Eurofloor S.A.: *See—*
Bomboire, Rene F., 4,089,724, Cl. 156-277.000.

Eutectic Corporation: *See*—
Lyons, John E., 4,089,293, Cl. 118-7.000.
Evans Products Company: *See*—
Stone, Thomas G., 4,089,274, Cl. 105-376.000.
Evans, Stephen F., to Procter & Gamble Company, The. Procedure for forming tampon sacks and filling same with aggregate. 4,089,149, Cl. 53-24.000.
Evans, William David James: *See*—
Diwell, Alan Francis; and Evans, William David James, 4,089,810, Cl. 252-462.000.
Ewin, James Coe, to Bell Telephone Laboratories, Incorporated. Sun screen structure. 4,089,594, Cl. 350-262.000.
Ex-Cell-O Corporation: *See*—
Elias, Charles R., 4,089,216, Cl. 73-136.00R.
Exxon Research & Engineering Co.: *See*—
Berger, Dietmar; and Eng, Jackson, 4,089,775, Cl. 208-111.000.
Cahn, Robert P., 4,089,744, Cl. 176-87.000.
Corbett, Luke W., 4,089,698, Cl. 106-278.000.
Engel, Lawrence J.; and Gardiner, John B., 4,089,794, Cl. 252-51.50A.
Gorbaty, Martin Leo; and Schlosberg, Richard Henry, 4,089,772, Cl. 208-8.000.
Patterson, John F.; and Galbraith, Kirk P., 4,089,741, Cl. 176-87.000.
F. L. Smidth & Co.: *See*—
Sylvest, Karl J., 4,089,634, Cl. 432-80.000.
Fa Alfred Hansel, Nieten-und Metallwarenfabrik: *See*—
Schwab, Manfred, 4,089,202, Cl. 72-391.000.
Fabri, Jon O.: *See*—
Svarz, Jerry J.; Kemmer, Frank N.; and Fabri, Jon O., 4,089,780, Cl. 210-53.000.
Fadeev, Evgeny Alexeevich: *See*—
Lipets, Adolf Usherovich; Moskvichev, Viktor Fedorovich; Katyshev, Georgy Viktorovich; Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Shamarokova, Raisa Nikiforovna; Dolgy, Alexei Arsentievich; Eletsky, Stanislav Alexandrovich; Grinberg, Yakov Natanovich; Ardamatsky, Vitaly Andreevich; Vivsik, Svyatoslav Nikolaevich; Zavedeev, Vasily Evdokimovich; Zevin, Ilya Julievich; and Fadeev, Evgeny Alexeevich, 4,089,369, Cl. 165-158.000.
Fahlen, Nils Torsten; Samuelsson, Jan; and Torseng, Sture Ragnar, to ASEA AB. Relay protection for capacitor banks. 4,090,226, Cl. 361-16.000.
Fairchild, Louis F.; Jones, Harlan M.; and Schrimper, Vernon L., to Iowa Manufacturing Company. Vibratory split roll. 4,089,616, Cl. 404-117.000.
Falconi, Giovanni: *See*—
Bernardi, Luigi; Elli, Carlo; Falconi, Giovanni; and Ferrari, Rosella, 4,089,862, Cl. 260-285.500.
Falgari, Jean Paul; Perdijon, Jean; and Voituriez, Bernard, to Commissariat a l'Energie Atomique. Apparatus for measuring the radial dimensions of a cylindrical tube by ultrasonics. 4,089,227, Cl. 73-622.000.
Falk, Edward J., to Wagner Electric Corporation. Cam actuated disc brake. 4,089,393, Cl. 188-72.600.
Falk, Robert A., to Ciba-Geigy Corporation. Method of improving fluorinated surfactants. 4,089,804, Cl. 252-355.000.
Fall, Herbert S.: *See*—
Fall, Martin K., 4,089,568, Cl. 308-3.800.
Fall, Martin K., to Fall, Herbert S. Slide assembly with bearing retainers coupled by floating clip. 4,089,568, Cl. 308-3.800.
Fallon, John Leslie: *See*—
Colglazier, Donald Francis; Fallon, John Leslie; Kollar, Ernest Paul; and Mares, Fred Ralph, 4,089,516, Cl. 271-9.000.
Famiglietti, Carmine: *See*—
Epstein, Heywood Y.; and Famiglietti, Carmine, 4,090,084, Cl. 250-439.00R.
Fanger, Hans Ulrich: *See*—
Michaelis, Walfried; Muller, Agmar; Fanger, Hans Ulrich; and Pepelnik, Rudolf, 4,090,072, Cl. 250-255.000.
Farhat, Nabil Hassan, to RCA Corporation. Electronically steered antenna system using a reflective surface formed of piezoelectric transducers. 4,090,204, Cl. 343-754.000.
Farrell, Daniel R.; and Ward, John W., to Union Oil Company of California. Method for rejuvenating hydroprocessing catalysts. 4,089,806, Cl. 252-413.000.
Farrior, William L., Jr., to United States of America, Energy. Regenerable sorbent and method for removing hydrogen sulfide from hot gaseous mixtures. 4,089,809, Cl. 252-459.000.
Farstad, Arnold J.; and Fisher, Carl, Jr., to United States of America, Interior. Wireless FSK technique for telemetering underground data to the surface. 4,090,135, Cl. 325-28.000.
Fascione, Pietro: *See*—
Baumgartner, Henri; Jacquemet, Andre; Meier, John George; and Vollerin, Bernard, 4,089,629, Cl. 431-9.000.
Vollerin, Bernard; and Baumgartner, Henri, 4,089,630, Cl. 431-9.000.
Faust, James H.; and Biagioli, Billy J., to A.B.C. Auto Alarms, Inc. Key operated switch for automobile alarm or the like. 4,090,046, Cl. 200-44.000.
Fay, Robert C., to Milliken Research Corporation. Method and apparatus to produce a textile product. 4,089,717, Cl. 156-72.000.
Fellers, Gary A., to HydroTech International, Inc. Apparatus and method for connecting pipes by welding. 4,089,455, Cl. 228-178.000.
Ferrari, Rosella: *See*—
Bernardi, Luigi; Elli, Carlo; Falconi, Giovanni; and Ferrari, Rosella, 4,089,862, Cl. 260-285.500.
Ferris, Carlisle Keith. Camouflaged aircraft, surface vessel or vehicle or the like. 4,089,491, Cl. 244-1.00R.
Ferro, Berkeley Michael; Spratling, Rodney Edwin; and Walker, Aubrey Douglas, to Post Office. Phosphorescent materials. 4,089,995, Cl. 427-157.000.
Ferry, Hugh J. Vehicle safety seating. 4,089,545, Cl. 280-751.000.
Fertilizers & Chemicals Limited: *See*—
Greidinger, Dahlia Simeona; and Cohen, Liuba, 4,089,899, Cl. 260-553.00R.
Field, Arnold William: *See*—
Blackburn, John Bryce; and Field, Arnold William, 4,089,699, Cl. 106-308.00Q.
Fields, Vestel: *See*—
Bayne, Ralph H.; and Fields, Vestel, 4,089,449, Cl. 224-42.240.
Fignar, Gerald P.: *See*—
Prange, Bernard H.; and Fignar, Gerald P., 4,089,559, Cl. 297-201.000.
Filimore, Dennis Arthur: *See*—
Preston, Peter Joseph; Roberts, George Leathwhite, Jr.; Filimore, Dennis Arthur; and Sheehan, Gerard Martin, 4,089,675, Cl. 75-1.00T.
Firestone Tire & Rubber Company, The: *See*—
Bohm, Georg Gustav Anton, 4,089,360, Cl. 152-330.00R.
Fischer, Gunter: *See*—
Flaschar, Heinz; Kleinschmidt, Heinz; Kroll, Peter; and Fischer, Gunter, 4,089,344, Cl. 137-491.000.
Fischer, Ronald H.: *See*—
Oleck, Stephen M.; Sherry, Howard S.; Fischer, Ronald H.; and Milstein, Donald, 4,089,774, Cl. 208-89.000.
Fischer, Wolfgang; and Hengst, Bernd, to Sachs-Systemtechnik GmbH. Battery operated water purification system. 4,089,768, Cl. 204-228.000.
Fisher, Carl, Jr.: *See*—
Farstad, Arnold J.; and Fisher, Carl, Jr., 4,090,135, Cl. 325-28.000.
Fisher, Maurice; Maber, Terence Walter; and Lilly, Colin Garry, to Rolls-Royce Limited. Method of removing Al-Cr-Co coatings from nickel alloy substrates. 4,089,736, Cl. 156-665.000.
Fisler, Charles F., to General Electric Company. Brightness control circuit for LED displays. 4,090,189, Cl. 340-335.000.
Fitzgerald, Maurice J., to Polaroid Corporation. Polymeric N-alkenyl carbamate silver halide peptizer. 4,089,688, Cl. 96-114.000.
Fitzgibbon, Jack R., to Balance Systems, Inc. Sash balances and components thereof. 4,089,085, Cl. 16-197.000.
Fives-Cail Babcock: *See*—
Ghestem, Gerard, 4,089,641, Cl. 432-80.000.
Flannigan, James Steven; Shadrick, Dennie Joel; and Scott, Bennett Sanford, to Texas Instruments Incorporated. Bubble memory redundancy storage. 4,090,251, Cl. 365-1.000.
Flaschar, Heinz; Kleinschmidt, Heinz; Kroll, Peter; and Fischer, Gunter, to Robert Bosch GmbH. Two-way pressure-control valve. 4,089,344, Cl. 137-491.000.
Flatau, Alison: *See*—
Bolanowski, Lelia Ann; and Flatau, Alison, 4,089,410, Cl. 206-63.300.
Flecto Coatings Ltd.: *See*—
Vasishth, Ramesh C.; and Chandramouli, Pitchaiya, 4,089,828, Cl. 260-29.6TA.
Flemings, Merton C.; Young, Kenneth P.; and Riek, Rodney G., to Massachusetts Institute of Technology. Method and apparatus for forming ferrous liquid-solid metal compositions. 4,089,680, Cl. 75-129.000.
Flouris, Soto F.: *See*—
Bernard, Stanley E.; Flouris, Soto F.; and Malhoit, Edward C., 4,089,593, Cl. 350-236.000.
Flynt, Larry Charles; and Flynt, Robert Clinton, Jr. Multiple position sewing machine cabinet. 4,089,572, Cl. 312-27.000.
Flynt, Robert Clinton, Jr.: *See*—
Flynt, Larry Charles; and Flynt, Robert Clinton, Jr., 4,089,572, Cl. 312-27.000.
FMC Corporation: *See*—
Haley, Harold A., 4,090,008, Cl. 428-192.000.
Foell, Theodore J.; and Rees, Richard W., to American Home Products Corporation. Claudogenic-interceptive nonapeptides. 4,089,946, Cl. 424-177.000.
Fogelberg, Mark John, to Borg-Warner Corporation. Direction-sensitive overrunning clutch. 4,089,395, Cl. 192-41.00A.
Fohr, Wolfgang: *See*—
Raffel, Reiner; Althausen, Ferdinand; Knipp, Ulrich; Krippl, Kurt; Fohr, Wolfgang; and Schwesig, Helmut, 4,089,206, Cl. 73-19.000.
Forbro Design Corp.: *See*—
Kiviranna, John, 4,090,123, Cl. 323-8.000.
Ford, Neville George. Packaging of electrical or electronic components. 4,089,574, Cl. 312-108.000.
Foris, Peter L.; Brown, Robert W.; and Phillips, Paul S., Jr., to NCR Corporation. Capsule manufacture. 4,089,802, Cl. 252-316.000.
Forney, Robert B.: *See*—
Brown, John S.; and Forney, Robert B., 4,089,260, Cl. 99-386.000.
Foroglou, Zafiris, to Eleusis Bauxite Mines-Mining Industrial and Shipping Inc. Method for increasing the MnO_2 content of natural manganese dioxide ore. 4,089,928, Cl. 423-49.000.
Forster, Hans-Joachim M.; Zaiser, Wolfgang; and Hensel, Werner, to Daimler-Benz Aktiengesellschaft. Planetary gear change-speed transmission, especially for motor vehicles. 4,089,238, Cl. 74-759.000.

Fortuin, John L.: *See*—
Moritz, Lyle E.; and Fortuin, John L., 4,089,113, Cl. 30-253.000.
Fox, Clarence Dennis: *See*—
Aubel, John Anton; and Fox, Clarence Dennis, 4,089,622, Cl. 417-188.000.
Fox Valley Corporation: *See*—
Lasiewicz, Thaddeus W.; Wrabl, Otto; and Oddo, Donald J., 4,089,294, Cl. 118-230.000.
Francesville Drain Tile Corporation: *See*—
Overmyer, Richard C.; and Guerra, Mario, 4,089,108, Cl. 29-820.000.
Franks, Nelson J.; Gray, Thomas W.; and Whitney, Ralph H., to Owens-Illinois, Inc. Pressure test fixture for pressurized containers. 4,089,208, Cl. 73-45.500.
Franz, James H., Jr., to Westinghouse Electric Corp. Transit vehicle chopper control apparatus and method. 4,090,115, Cl. 318-341.000.
Freed, Donald L., Jr.; and Baum, Gerald L., to National Mine Service Company. Swivel assembly for a conveyor. 4,089,403, Cl. 198-316.000.
Freed, Meier E.; and Potoski, John R., to American Home Products Corporation. 2,3,4,4a-Tetrahydro-1H-pyrazino[1,2]quinoxalin-5(6)-ones and derivatives thereof. 4,089,958, Cl. 424-250.000.
French, William George; and Tasker, G. William, to Bell Telephone Laboratories, Incorporated. Single mode optical transmission line. 4,089,586, Cl. 350-96.300.
Frey, Gerhard: *See*—
Anderle, Fritz; Frey, Gerhard; Grein, Lutz; Reimpell, Uwe; and Stark, Friedrich, 4,089,505, Cl. 251-133.000.
Friend, Manuel N.: *See*—
Schwebel, Paul R.; and Friend, Manuel N., 4,089,334, Cl. 128-173.00H.
Frink, Russell E.; and Milianowicz, Stanislaw A., to Westinghouse Electric Corp. Energy-storage operating mechanisms for circuit-interrupting structures alone and also for circuit-interrupting structures utilizing serially-related disconnecting-switch structures therewith. 4,090,051, Cl. 200-144.00R.
Frodsham, Thomas William Gordon, to Imperial Chemical Industries Limited. Photopolymerizable compositions. 4,089,762, Cl. 204-159.150.
FROMM AG: *See*—
Synek, Wenzel, 4,089,352, Cl. 140-93.200.
Fruehauf Corporation: *See*—
Banerjea, Tara N.; and Stinson, Donald B., Jr., 4,089,558, Cl. 296-137.00R.
Frykholm, Paul R. Device for handling pole vault crossbars. 4,089,553, Cl. 294-19.00R.
Fuhrer, Egon; Kleinert, Dieter; and Haring, Reinhard, to Schultz, Wolfgang E. Electromagnetic clutch or brake. 4,090,161, Cl. 335-281.000.
Fuji Photo Film Co., Ltd.: *See*—
Kondo, Toshihiro, 4,090,209, Cl. 354-25.000.
Kuboshima, Makoto, 4,089,599, Cl. 353-70.000.
Oishi, Yasushi; Horiuchi, Hideo; Goto, Toshio; and Hamada, Yoichi, 4,090,211, Cl. 354-86.000.
Shimiya, Keiji; Miura, Norio; Takano, Masao; and Ishigaki, Kunio, 4,090,085, Cl. 250-483.000.
Shirahata, Ryuji; Suzuki, Masaaki; Yamada, Yasuyuki; Kitamoto, Tatsuji; and Dezawa, Shin-ichiro, 4,089,993, Cl. 427-129.000.
Fuji Xerox Co., Ltd.: *See*—
Suga, Gojiro, 4,090,188, Cl. 340-324.0AD.
Suzuki, Katsuo, 4,089,378, Cl. 169-54.000.
Fujimoto, Masanori: *See*—
Tsuji, Kozo; Fujimoto, Masanori; Masuko, Fujio; and Nagase, Tsuneyuki, 4,090,016, Cl. 536-1.000.
Fukamichi, Kazuaki: *See*—
Saito, Hideo; Fukamichi, Kazuaki; Saito, Yoshinobu; and Sugimoto, Sakae, 4,089,711, Cl. 148-11.50R.
Fukuyama, Katsuhiko. Needle container. 4,089,413, Cl. 206-382.000.
Fuller, Frederick B.; Orosz, Miklos J.; Williams, Richard H., Jr.; and Diimmler, Glen F., to Square D Company. High voltage motor starter enclosure. 4,090,230, Cl. 361-345.000.
Funk, Roger Calvin, to Davey Tree Expert Company, The. High analysis fertilizers. 4,089,670, Cl. 71-29.000.
Furcini, James F. Wind deflector for an automotive vehicle. 4,089,256, Cl. 98-2.120.
Furr, Barrington John Albert, to Imperial Chemical Industries Limited. Oestrus or menstrual regulation. 4,089,951, Cl. 424-232.000.
Furuya, Tsutomu; Ayabe, Shinichi; Kobayashi, Miyuki; and Tanimoto, Tadao, to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo. Echinatin glycosides. 4,089,606, Cl. 536-4.000.
Futurumverken AB: *See*—
Bergmark, Nils Randolf; and Westermark, Thord Ingvar Eugen, 4,089,328, Cl. 126-299.00D.
G-C Dental Industrial Corp.: *See*—
Tezuka, Chojiro; and Karasawa, Yoshimitsu, 4,089,830, Cl. 260-29.60H.
G.K.N. Fasteners Limited: *See*—
Gill, Peter John, 4,089,357, Cl. 145-50.00A.
Gaio, Pietro: *See*—
Gandolfi, Carmelo; Doria, Gianfederico; and Gaio, Pietro, 4,089,896, Cl. 260-514.00D.
Galbraith, Kirk P.: *See*—
Patterson, John F.; and Galbraith, Kirk P., 4,089,741, Cl. 176-87.000.
Galileo Electro-Optics Corp.: *See*—
Tosswill, Christopher H., 4,090,080, Cl. 250-366.000.
Gamache, David Leo: *See*—
Kraska, Irvin R.; Mathieson, Thomas A.; Johnson, Richard N.; Lichodziejewski, Wieslaw L.; Gamache, David Leo; and Ash, Leon, 4,089,225, Cl. 73-614.000.
Gambrell, Lawrence Mitchell, to Allied Chemical Corporation. Process for preparing a gasiform hydrocarbon fuel from hydrocarbon fuel oil. 4,089,805, Cl. 252-373.000.
Gandolfi, Carmelo; Doria, Gianfederico; and Gaio, Pietro, to Carlo Erba S.p.A. 8,12-Diisoprostanoic acid derivatives. 4,089,896, Cl. 260-514.00D.
Ganellin, Charon Robin: *See*—
Durant, Graham John; Ganellin, Charon Robin; and White, George Raymond, 4,090,026, Cl. 548-342.000.
Gangneux, Philippe Yves Edouard, to Produits Chimiques Ugine Kuhlmann. Process for the coloration of polyamides with pigments derived from carboxyamido-polyimides. 4,089,836, Cl. 260-37.00N.
Ganslaw, Stuart H.; and Katz, Howard G., to National Starch and Chemical Corp. Absorbent composition of matter. 4,090,013, Cl. 526-15.000.
Gard, Inc.: *See*—
Kraska, Irvin R.; Mathieson, Thomas A.; Johnson, Richard N.; Lichodziejewski, Wieslaw L.; Gamache, David Leo; and Ash, Leon, 4,089,225, Cl. 73-614.000.
Kraska, Irvin R.; Stark, John; and Lichodziejewski, Wieslaw L., 4,089,226, Cl. 73-614.000.
Gardiner, John B.: *See*—
Engel, Lawrence J.; and Gardiner, John B., 4,089,794, Cl. 252-51.50A.
Gardner, Jeffrey M., to Container Corporation of America. Hanger supporting arrangement. 4,089,411, Cl. 206-300.000.
Gargini, Eric John, to Communications Patents Limited. Wired broadcasting systems for processing coded data representative of subscriber station conditions. 4,090,220, Cl. 358-86.000.
Garrett Corporation, The: *See*—
Ashe, Thomas L., 4,089,176, Cl. 60-650.000.
Garrison, Charles G.: *See*—
Goddard, Terrence P.; Thatcher, Donald N.; and Garrison, Charles G., 4,089,716, Cl. 149-10.000.
Gatti, Fernando: *See*—
Stradella, Giuseppe; Stradella, Umberto; Daniele, Giuliano; and Gatti, Fernando, 4,089,342, Cl. 137-102.000.
Gauer, Peter, to Loesche Hartzerkleinerungs-und Zementmaschinen GmbH & Co. KG. Tube mill. 4,089,476, Cl. 241-70.000.
Gauger, Jurgen, to Battelle Development Corporation, The. Process for separating a substance from a liquid medium containing the substance in dissolved form. 4,089,778, Cl. 210-23.00F.
Gaughan, Edmund J.: *See*—
Arneklev, Duane R.; Pallos, Ferenc M.; and Gaughan, Edmund J., 4,089,673, Cl. 71-93.000.
Gear, Adrian R. L., to University of Virginia. Stopped-flow reaction apparatus utilized in conjunction with continuous-flow resistive-particle counting apparatus. 4,090,129, Cl. 324-71.0CP.
Gearhart-Owen Industries, Inc.: *See*—
Hallmark, Bobby J., 4,089,381, Cl. 175-4.600.
Gebr. Marklin & Cie. GmbH: *See*—
Sebald, Walter, 4,089,233, Cl. 74-424.80A.
Gebruder Netzsch, Maschinenfabrik: *See*—
John, Willy, 4,089,473, Cl. 241-41.000.
Gee, Gordon E.: *See*—
Brown, Dennis L.; Gee, Gordon E.; and Wilson, Michael A., 4,090,091, Cl. 307-116.000.
General Atomic Company: *See*—
Norman, John H.; Russell, John L., Jr.; and Stowell, Susan A., 4,089,939, Cl. 423-648.00R.
Norman, John H.; Russell, John L., Jr.; Porter, John T., II; McCorkle, Kenneth H.; Roemer, Thomas S.; and Sharp, Robert, 4,089,940, Cl. 423-648.00R.
General Electric Company: *See*—
Amaral, Louis; Brayman, Kenneth Wood; and Smith, Bart Alan, 4,089,742, Cl. 176-78.000.
Barchet, Reinhold J., 4,089,576, Cl. 339-18.00P.
Fisler, Charles F., 4,090,189, Cl. 340-335.000.
Giles, Walter B., 4,089,631, Cl. 431-9.000.
Griffith, Robert James; and Plunkett, Allan Barr, 4,090,119, Cl. 318-432.000.
Kindig, Alan L., 4,089,254, Cl. 93-1.00R.
Lippitt, David L., 4,090,116, Cl. 318-345.00E.
Schumacher, Frank A.; and Magester, Earl H., 4,089,187, Cl. 62-289.000.
Serrano, Juan de. J., 4,090,092, Cl. 307-116.000.
Simpson, Verne G., 4,089,833, Cl. 260-29.15B.
Stevenson, Howard R., Jr., 4,090,196, Cl. 343-5.00R.
Thomas, George L.; and Woodall, Edward L., Jr., 4,089,694, Cl. 106-53.000.
Thompson, Paige W., 4,090,093, Cl. 307-117.000.
Ward, William J., III, 4,089,653, Cl. 23-284.000.
General Electric Company Limited, The: *See*—
Shuttleworth, Anthony Ernest, 4,090,192, Cl. 340-347.0NT.
General Foods Corporation: *See*—
Lugay, Joaquin Castro; Haas, Gerhard Julius; and Beale, Robert James, 4,089,978, Cl. 426-32.000.
General Foods Ltd.: *See*—
Mostyn, William Max; Verrall, Roger Percy; and Shrimpton, Brian Clifford, 4,089,988, Cl. 426-578.000.
General Mills, Inc.: *See*—
Gilbertson, Dennis, 4,089,984, Cl. 426-293.000.

General Motors Corporation: *See—*
Canty, Eugene T.; Tow, Russell P.; Spayth, Frank J.; Morrow, Richard A.; and Smith, Charlie B., 4,090,198, Cl. 343-18.00D.
Sharma, Ram A.; and Bradley, Thompson G., 4,089,931, Cl. 423-290.000.

General Scanning, Inc.: *See—*
Selverstone, Peter, 4,090,112, Cl. 318-128.000.

General Signal Corporation: *See—*
Lundeberg, Russell Edgar, 4,090,029, Cl. 174-51.000.
Sibley, Henry C., 4,090,173, Cl. 340-146.1BA.

Genzling, Claude. Safety connection between bicycle pedal and shoe. 4,089,236, Cl. 74-594.400.

Georg Fischer Aktiengesellschaft: *See—*
Aeschbacher, Hans Manuel; and Bottlang, Johann, 4,089,465, Cl. 220-400.000.

Georg Spiess GmbH: *See—*
Marass, Josef, 4,089,517, Cl. 271-13.000.

Georgia-Pacific Corporation: *See—*
Neal, John A., 4,089,779, Cl. 210-42.00S.

Geraci, James Leonard. Rotary torque actuator. 4,089,229, Cl. 74-57.000.

Gerdes, Robert K.: *See—*
Milam, Joseph E.; Dean, Warren E.; and Gerdes, Robert K., 4,089,909, Cl. 260-650.00R.

Gerecht, John Fred, to Colgate-Palmolive Company. Sulfonium salt substantive sunscreen materials. 4,089,868, Cl. 260-308.00B.

Gesellschaft fur Kernenergie in Schiffbau u. Schiffahrt mbH: *See—*
Michaelis, Walfried; Muller, Agmar; Fanger, Hans Ulrich; and Pepelnik, Rudolf, 4,090,072, Cl. 250-255.000.

Ghesquier, Andre Jean Gerard. Installations for the manufacture of beams composed of glued laminae. 4,089,732, Cl. 156-580.000.

Ghestem, Gerard, to Fives-Cail Babcock. Rotary kiln with cluster of cooling tubes. 4,089,641, Cl. 432-80.000.

Gibson, Jack E. Method of powder coating the interior of tubular goods. 4,089,998, Cl. 427-182.000.

Gibson, John F.: *See—*
White, Ronald D.; and Gibson, John F., 4,089,989, Cl. 427-2.000.

Gidlof, Karl Gunnar: *See—*
Almer, Bengt Onnert; and Gidlof, Karl Gunnar, 4,089,615, Cl. 404-6.000.

Giesselmann, Gunter; Schreyer, Gerd; and Vanheertum, Rudolf, to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler. Process for the production of isothiocyanates. 4,089,887, Cl. 260-454.000.

Giken Co., Ltd.: *See—*
Ishida, Mitsuo, 4,089,343, Cl. 137-484.800.

Gilbertson, Dennis, to General Mills, Inc. Sweet coatings for food products. 4,089,984, Cl. 426-293.000.

Giles, Walter B., to General Electric Company. Coal-burning gas turbine combustion system for reducing turbine erosion. 4,089,631, Cl. 431-9.000.

Gilker, Clyde; and Lamke, Arland D., to McGraw-Edison Company. Fail-safe circuit for tap-changing transformer regulating system. 4,090,225, Cl. 361-3.000.

Gill, Peter John, to G.K.N. Fasteners Limited. Threaded fastener. 4,089,357, Cl. 145-50.00A.

Gillan, John: *See—*
Coates, Roger Hampton; and Gillan, John, 4,089,819, Cl. 260-2.50N.

Gimda, Inc.: *See—*
Carden, John, 4,089,561, Cl. 299-83.000.

Ginsberg, Guenter: *See—*
Simpson, Ronald O.; Starling, J. David; James, Bobby D.; Godin, Thomas John; Ginsberg, Guenter; and Drbal, Vladimir J., 4,090,128, Cl. 324-71.0CP.

Girling Limited: *See—*
Ostrowski, Piotr, 4,089,392, Cl. 188-71.400.

Giuliani, Robert L. Valve construction. 4,089,504, Cl. 251-86.000.

Giustini, Augusto. Device for measuring with direct current the total resistance of a circuit when there is also present an alternative component from the mains. 4,090,127, Cl. 324-62.000.

Glabiszewski, Richard, to Otto Bock Orthopadische Industrie K.G. Prosthetic appliance. 4,089,072, Cl. 3-30.000.

Glatzel, Erhard; and Zajadatz, Heinz, to Carl Zeiss Stiftung. Extremely high speed objective. 4,089,591, Cl. 350-214.000.

Gleason, John Gerald: *See—*
Buckley, Thomas Francis; and Gleason, John Gerald, 4,089,956, Cl. 424-248.530.

Glucksman, Dov Zeev. Electric air-heater unit utilizing a centrifugal impeller. 4,090,061, Cl. 219-369.000.

Gobert, Richard Lee: *See—*
Ansari, Mohammad Tariq; and Gobert, Richard Lee, 4,090,181, Cl. 340-271.000.

Gocke, Eberhard, to Braukmann Armaturen A.G. Thermostatic radiator valve. 4,089,461, Cl. 236-42.000.

Goddard, Terrence P.; Thatcher, Donald N.; and Garrison, Charles G., to Teledyne McCormick-Selph, an operating division of Teledyne Industries, Inc. Ignition enhancing propellant coatings. 4,089,716, Cl. 149-10.000.

Godin, Thomas John: *See—*
Simpson, Ronald O.; Starling, J. David; James, Bobby D.; Godin, Thomas John; Ginsberg, Guenter; and Drbal, Vladimir J., 4,090,128, Cl. 324-71.0CP.

Golden, Douglas. Illumination means for the head. 4,090,232, Cl. 362-106.000.

Golets, Nikolai Trofimovich: *See—*
Polsky, Jury Mikhailovich; Zakharov, Valentin Petrovich; Golets, Nikolai Trofimovich; Tayakin, Jury Vasilievich; Lipovetsky, Gennady Petrovich; Protsenko, Valery Vasilievich; Khomenko, Alexandr Dmitrievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich, 4,090,246, Cl. 364-736.000.

Goloff, Alexander, to Caterpillar Tractor Co. Port insulation for internal combustion engines. 4,089,306, Cl. 123-32.00K.

Good, William K.; and Harbage, Wilson J., to Koppy Corporation. Method of forming an annular slot in a longitudinally splined annular member. 4,089,097, Cl. 29-163.50R.

Goode, Vern Evert: *See—*
Sandor, Joseph; and Goode, Vern Evert, 4,089,414, Cl. 206-444.000.

Goral, Andrzej: *See—*
Kulig, Stanislaw; Goral, Andrzej; Surkow, Wlodzimierz; Szczepanik, Andrzej; and Szulaczewski, Edward, 4,089,663, Cl. 55-276.000.

Gorbaty, Martin Leo; and Schlosberg, Richard Henry, to Exxon Research & Engineering Co. Alkylation or acylation of liquefaction product bottoms. 4,089,772, Cl. 208-8.000.

Gorham International Inc.: *See—*
Sawyer, Willard C., 4,089,121, Cl. 34-16.000.

Gorham, Jack R.; and Chalker, Harold W. Rifle stand. 4,089,423, Cl. 211-64.000.

Gosselin, Andrew F. Farm implement trailer. 4,089,430, Cl. 214-86.00A.

Gosteli, Jacques; Storni, Angelo; and Zust, Armin, to Ciba-Geigy Corporation. Antiemetic, psychosomatic and antipsychotic heterocyclic pyridine carboxamides. 4,089,960, Cl. 424-266.000.

Goto, Kenjiro, to Mansei Kogyo Kabushiki Kaisha. Battery ignitable cigarette lighter. 4,089,636, Cl. 431-132.000.

Goto, Toshio: *See—*
Oishi, Yasushi; Horiuchi, Hideo; Goto, Toshio; and Hamada, Yoichi, 4,090,211, Cl. 354-86.000.

Gould Inc.: *See—*
Rys, Tadeusz J., 4,090,157, Cl. 335-8.000.

Goulding Chemicals Limited: *See—*
Thompson, William Henry; Worthington, Ralph Eric; and Stamper, David John, 4,089,936, Cl. 423-483.000.

Gourley, Charles Angus: *See—*
Barry, Richard Francis; Gourley, Charles Angus; and Kohanek, Dennis George, 4,089,104, Cl. 29-626.000.

GOW Enterprises Limited: *See—*
Westerlund, H. Benny, 4,089,771, Cl. 204-284.000.

Goyal, Shri K.; and Bluestein, Leo I., to GTE Laboratories Incorporated. Automatic sharpness control circuit for a television receiver. 4,090,217, Cl. 358-37.000.

Grabbe, Dimitry G., to AMP Incorporated. Connector for connecting a circuit element to the surface of a substrate. 4,089,575, Cl. 339-17.0CF.

Gramling, James T. Method and apparatus for forming gaskets and the like. 4,089,242, Cl. 83-95.000.

Grana, David C.; and Haynes, David P., to United States of America, National Aeronautics and Space Administration. Remote water monitoring system. 4,089,209, Cl. 73-61.00R.

Grandini, Angelo: *See—*
Cardone, Michele; Grandini, Angelo; and Zaramella, Bruno, 4,090,162, Cl. 335-289.000.

Grassmann, Peter, to Siemens Aktiengesellschaft. Medical examining apparatus for the production of transverse sectional images. 4,090,079, Cl. 250-360.000.

Gravitis, Vilis Leonids: *See—*
Watt, John Stanley; and Gravitis, Vilis Leonids, 4,090,074, Cl. 250-273.000.

Gray, Thomas W.: *See—*
Franks, Nelson J.; Gray, Thomas W.; and Whitney, Ralph H., 4,089,208, Cl. 73-45.500.

Great Lakes Chemical Corporation: *See—*
Levek, Robert P.; and Williams, David O., 4,089,912, Cl. 260-862.000.

Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., to Kewanee Industries. Polymeric anti-microbial agent. 4,089,977, Cl. 424-329.000.

Green, Paul James: *See—*
Chutter, Raymond Allen; Green, Paul James; Hofmann, Robert Lee; and Long, Daniel Rose, 4,089,437, Cl. 222-94.000.

Green, William J., to Vogen, Stanley O. Raft with removable weighted members that provide buoyancy. 4,089,528, Cl. 272-122.000.

Greenwald, Richard B.: *See—*
Bloom, Stanley M.; Borror, Alan L.; and Greenwald, Richard B., 4,089,866, Cl. 260-304.00C.

Gregg, Oscar P. Rotary internal combustion engine. 4,089,305, Cl. 123-244.000.

Gregory, Lester, Jr. Coin testing device. 4,089,400, Cl. 194-97.00A.

Greidinger, Dahlia Simeona; and Cohen, Liuba, to Fertilizers & Chemicals Limited. Fertilizer compound of the ureaform type and a method for the production thereof. 4,089,899, Cl. 260-553.00R.

Greig, David R. Garden watering device. 4,089,469, Cl. 239-287.000.

Grein, Lutz: *See—*
Anderle, Fritz; Frey, Gerhard; Grein, Lutz; Reimpell, Uwe; and Stark, Friedrich, 4,089,505, Cl. 251-133.000.

Gremlin Industries, Inc.: *See—*
Hauck, Lane T., 4,089,524, Cl. 273-85.00G.

Grenat, Bernard: *See—*
Dubost, Rene; and Grenat, Bernard, 4,089,154, Cl. 57-3.000.

Grgic, Ivica: *See—*
Schneider, Fritz W.; and Grgic, Ivica, 4,090,262, Cl. 366-155.000.

Griffith, Robert James; and Plunkett, Allan Barr, to General Electric

Company. Torque analog of a series wound DC traction motor. 4,090,119, Cl. 318-432.000.

Grinberg, Yakov Natanovich: *See—*
Lipets, Adolf Usherovich; Moskvichev, Viktor Fedorovich; Katyshev, Georgy Viktorovich; Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Shamarokova, Raisa Nikiforovna; Dolgy, Alexei Arsentievich; Eletsky, Stanislav Alexandrovich; Grinberg, Yakov Natanovich; Ardamatsky, Vitaly Andreevich; Vivsik, Svyatoslav Nikolaevich; Zavedeev, Vasily Evdokimovich; Zevin, Ilya Julievich; and Fadeev, Evgeny Alexeevich, 4,089,369, Cl. 165-158.000.

Gring, Frank M.; and Sordillo, Arthur C. Combination applicator and closure cap means for shaving cream containers. 4,089,609, Cl. 401-130.000.

Griswold, Victor Michael: *See—*
Twibell, Jerome J.; Griswold, Victor Michael; and Calle, Jaime, 4,090,239, Cl. 364-200.000.

Groh, Wolfgang: *See—*
Bronstert, Klaus; Ladenberger, Volker; Druschke, Wolfgang; Groh, Wolfgang; and Mueller, Helmut, 4,089,824, Cl. 260-27.0BB.

Grover, Thomas Reaks: *See—*
Couvillon, Lucien Alfred, Jr.; Grover, Thomas Reaks; Baker, Charles Dewitt; and Topham, William Sanford, 4,089,329, Cl. 128-2.00T.

Grow Chemical Corp.: *See—*
Tsou, Ivan H., 4,089,844, Cl. 260-77.5CR.

Grundy, James D., to Williams Gold Refining Company Incorporated. Method for producing nickel metal powder. 4,089,676, Cl. 75-.5AA.

Gryctko, Carl E., to I-T-E Imperial Corporation. Circuit breaker having solid state and thermal-magnetic trip means. 4,090,156, Cl. 335-6.000.

Grzech, Stephen P.: *See—*
Brynko, Carl; and Grzech, Stephen P., 4,089,547, Cl. 282-27.500.

GTE Laboratories Incorporated: *See—*
Goyal, Shri K.; and Bluestein, Leo I., 4,090,217, Cl. 358-37.000.

GTE Sylvania Incorporated: *See—*
Constable, Douglas W., 4,090,216, Cl. 358-21.000.
Jerabek, Charles F.; Parent, Edward D.; and Smith, Harold W., 4,089,643, Cl. 432-262.000.
Pearce, Daniel Scott, 4,090,146, Cl. 330-2.000.

Guennou, Serge; and Maugis, Raymond, to U.S. Philips Corporation. Anti-burglar mini-radar. 4,090,195, Cl. 343-5.0PD.

Guerra, Mario: *See—*
Overmyer, Richard C.; and Guerra, Mario, 4,089,108, Cl. 29-820.000.

Gueussier, Andre Louis, to Cefilac. Process for the manufacture of steel products. 4,089,681, Cl. 75-133.500.

Guibert, Raul. Food processing technique. 4,089,322, Cl. 126-261.000.

Guins, Sergei G. Adjustable fluid actuated bulkhead. 4,089,273, Cl. 105-376.000.

Gurley, Derrel G., to Dow Chemical Company, The. Hydraulic releasing tool with plug. 4,089,548, Cl. 285-3.000.

Gust, Karl; Hankel, Albert; Hasenclever, Horst; and Titze, Eberhard, to Mannesmannrohren-Werke AG. Noise attenuation during steam blowing of coated tubes. 4,089,122, Cl. 34-79.000.

Gustafsson, Gustaf Erik. Locking device, particularly for automobile seats. 4,089,500, Cl. 248-429.000.

Gustin, Jean Pierre R., to Societe Anonyme dite: La Buvette. Device for adapting the rate of flow of an automatic drinking bowl. 4,089,350, Cl. 138-45.00A.

Guth, Lloyd A.: *See—*
McMahon, Melvin B.; Guth, Lloyd A.; and Thomas, Larry A., 4,090,088, Cl. 307-38.000.

Gutmann, Walter: *See—*
Pfeifer, Josef; Paulus, Rudolf; Gutmann, Walter; and Resch, Michael, 4,090,206, Cl. 346-107.00R.

Haas, Gerhard Julius: *See—*
Lugay, Joaquin Castro; Haas, Gerhard Julius; and Beale, Robert James, 4,089,978, Cl. 426-32.000.

Habereder, Peter; and Bayerlein, Friedrich, to Diamalt Aktiengesellschaft. Paper coating dyes. 4,089,646, Cl. 8-7.000.

Hafele, Robert X.; and LoMaglio, Lewis C., to Ethyl Corporation. Accumulative pressure pump. 4,089,442, Cl. 222-321.000.

Hafke, Carl: *See—*
Baron, Gerhard; Rudolph, Paul; Kohlen, Rudolf; and Hafke, Carl, 4,089,659, Cl. 48-197.00R.

Hale Fire Pump Company: *See—*
Eberhardt, H. Alfred, 4,089,345, Cl. 137-596.200.

Haley, David J., to Monsanto Company. Method and apparatus for making a nonwoven fabric. 4,089,720, Cl. 156-181.000.

Haley, Harold A., to FMC Corporation. Edge abrasion resistant plastic strapping and method and apparatus for making the same. 4,090,008, Cl. 428-192.000.

Hall, Charles M.; and Wright, John B., to Upjohn Company, The. Cyano phenylene dioxamic acid compounds used in the treatment of allergy. 4,089,973, Cl. 424-304.000.

Hallmark, Bobby J., to Gearhart-Owen Industries, Inc. Chamber isolator and sealing means for borehole perforating tools. 4,089,381, Cl. 175-4.600.

Halter, Mark A., to UOP Inc. Electrochemical oxidation of alkoxy-substituted aromatic compounds. 4,089,757, Cl. 204-78.000.

Hamada, Yoichi: *See—*
Oishi, Yasushi; Horiuchi, Hideo; Goto, Toshio; and Hamada, Yoichi, 4,090,211, Cl. 354-86.000.

Hamasaki, Iwao; and Maekawa, Koji, to Sharp Kabushiki Kaisha. Effective digit capacity modification means for integrated circuit calculators. 4,090,245, Cl. 364-712.000.

Hamilton, William F., II. Touch controlled switch system operable by touch inputs and coded message signals transmitted over power line. 4,090,184, Cl. 340-310.00A.

Hamlin, Thomas J.: *See—*
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,089,515, Cl. 271-3.000.

Hammond, James Woodrow: *See—*
Loomis, Phillip Eugene; Hammond, James Woodrow; and Shughart, Mervin Leonard, 4,089,405, Cl. 198-475.000.

Hampton, J. D., to John Zink Company. Apparatus for and process of fabrication of elongated and cylindrical structures. 4,089,454, Cl. 228-173.00A.

Hanawalt, Joseph D. Method and product for protecting molten magnesium. 4,089,678, Cl. 75-67.00A.

Hancock, Allen W., II, to Sun Ventures, Inc. Distillation column reactor and process. 4,089,752, Cl. 203-99.000.

Handsman, Frederic B., to Ehrenreich Photo-Optical Industries, Inc. Easel with masking frame. 4,089,604, Cl. 355-74.000.

Hankel, Albert: *See—*
Gust, Karl; Hankel, Albert; Hasenclever, Horst; and Titze, Eberhard, 4,089,122, Cl. 34-79.000.

Hara, Yoshiaki: *See—*
Mori, Shigeo; Murakami, Fumikazu; Hara, Yoshiaki; Horikoshi, Ichiro; and Takahashi, Souya, 4,090,041, Cl. 179-115.00R.

Harada, Hiroo: *See—*
Akoh, Shigeichi; Harada, Hiroo; Ueda, Yutaka; and Kurosawa, Masao, 4,089,255, Cl. 93-36.010.

Haralampiev, Iliya Stoilkov: *See—*
Mishev, Georgi Nikolov; and Haralampiev, Iliya Stoilkov, 4,089,627, Cl. 425-303.000.

Harbage, Wilson J.: *See—*
Good, William K.; and Harbage, Wilson J., 4,089,097, Cl. 29-163.50R.

Harden, Richard L. Feeder for hay bales and stacks. 4,089,301, Cl. 119-60.000.

Harding, Andrew Baxter: *See—*
Denton, Norman; and Harding, Andrew Baxter, 4,089,550, Cl. 285-276.000.

Haring, Reinhard: *See—*
Fuhrer, Egon; Kleinert, Dieter; and Haring, Reinhard, 4,090,161, Cl. 335-281.000.

Harley, David N., to ITW Limited. Furniture connector. 4,089,614, Cl. 403-407.000.

Harmke, Charles Raymond; and O'Neill, Daniel Edward, to Boeing Company, The. Air classifier. 4,089,422, Cl. 209-137.000.

Harper, Stanley Arthur, to RCA Corporation. Photographic method for printing particle pattern with improved adherence utilizing vanadates. 4,089,687, Cl. 96-35.100.

Harrington, Timothy M.: *See—*
Marshall, J. Howard, III; and Harrington, Timothy M., 4,090,082, Cl. 250-375.000.

Harris, Arthur; Burrows, John; and Jones, Thomas Ivor, to Ciba-Geigy Corporation. Treatment of water or aqueous systems. 4,089,796, Cl. 252-181.000.

Harris Corporation: *See—*
Whitman, John G., Jr., 4,090,201, Cl. 343-117.00R.

Harris, David W.: *See—*
Branecky, Anthony J.; and Harris, David W., 4,089,886, Cl. 260-450.000.

Harris, Donald Wayne: *See—*
Antrim, Richard Lee; and Harris, Donald Wayne, 4,089,745, Cl. 195-33.000.

Harris, Howard A., to Shell Oil Company. Benzimidazobenzisoquinolinone ureas useful as grease thickeners. 4,089,854, Cl. 260-282.000.

Harris, James H.: *See—*
Kronner, Richard F., 4,089,337, Cl. 128-348.000.

Harris, James M., to National Semiconductor Corporation. Method for passivating aluminum layers on semiconductive devices. 4,089,709, Cl. 148-6.270.

Harris, Rano J. Microsyringe. 4,089,335, Cl. 128-218.00P.

Harrison, Roger Garrick; Jamieson, William Boffey; Ross, William James; and Saunders, John Christopher, to Lilly Industries Limited. Acylamino triazoles as antiasthmatic agents. 4,089,962, Cl. 424-269.000.

Harshaw Chemical Company, The: *See—*
Swinehart, Carl F.; and Packer, Herbert, 4,089,937, Cl. 423-490.000.

Hart, Mark M. Cooking grill and briquettes therefor. 4,089,261, Cl. 99-446.000.

Hart, Robert Lee. Opto-electronic lock device. 4,090,175, Cl. 340-164.00R.

Hartigan, Edward G.; and Patience, Donald, to Kendall Company, The. Surgical drape with fenestration liner. 4,089,331, Cl. 128-132.00D.

Hartz Mountain Corporation, The: *See—*
Suchowski, Bernard, 4,089,299, Cl. 119-51.00R.

Hasegawa, Niichiro: *See—*
Koyanagi, Shunichi; Hasegawa, Niichiro; Shimizu, Toshihide; Kaneko, Ichiro; and Katsushima, Sensaku, 4,090,015, Cl. 526-62.000.

Hasenclever, Horst: *See—*
Gust, Karl; Hankel, Albert; Hasenclever, Horst; and Titze, Eberhard, 4,089,122, Cl. 34-79.000.

Hashizume, Nobuo: *See—*
Tateno, Hiroshi; Kataoka, Shoei; Hashizume, Nobuo; and Komamiya, Yasuo, 4,090,155, Cl. 333-80.00T.

Hasler, Rolf: *See—*
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Hastings, Reeve R.: *See—*
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Hatcher, David B. Method for treating cellulosic material. 4,090,000, Cl. 427-393.000.

Hauchart, Jean Lucien Alexandre, to Compagnie Honeywell Bull (Societe Anonyme). Matching arrangement for converting bi-directional signals into binary signals. 4,090,154, Cl. 333-32.000.

Hauck, Lane T., to Gremlin Industries, Inc. Digitally controlled electronic game. 4,089,524, Cl. 273-85.00G.

Haug, Theobald; Kiefer, Jurg; Ruf, Peter; and Schmitter, Andre, to Ciba-Geigy Corporation. Thermosetting mixtures which are stable on storage from polyimide and β-amino-crotonic acid. 4,089,845, Cl. 260-78.00A.

Haugen, Haakon; and Weetman, David G., to Texaco Inc. Lubricating oil composition. 4,089,791, Cl. 252-32.70E.

Haupt, Robert C.; and Peterson, Donald E., to Allis-Chalmers Corporation. Park lock and gear shift for a vehicle transmission. 4,089,394, Cl. 192-4.00A.

Havas, Janos; Lechaton, John S.; and Logan, Skinner, to International Business Machines Corporation. Structure for making coplanar layers of thin films. 4,090,006, Cl. 428-81.000.

Hawley Manufacturing Corporation: *See—*
Overmyer, Robert C.; and Nijhawan, Pramodh, 4,089,640, Cl. 432-73.000.

Hay, Harold R. Process and apparatus for modulating temperatures within enclosures. 4,089,916, Cl. 261-153.000.

Hayakawa, Koji: *See—*
Okamoto, Tomiyasu; Nishimoto, Tsunanori; Sawada, Kaoru; Hayakawa, Koji; and Kurihara, Tomomichi, 4,089,285, Cl. 114-74.00A.

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Hayashibara Biochemical Laboratories, Inc.: *See—*
Tsuji, Kozo; Fujimoto, Masanori; Masuko, Fujio; and Nagase, Tsuneyuki, 4,090,016, Cl. 536-1.000.

Hayes, Douglas R., to United Technologies Corporation. Mold having integral preformed gating system. 4,089,364, Cl. 164-363.000.

Haynes, David P.: *See—*
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Hazen, Gretz L., to DEC International, Inc. Cheese making apparatus. 4,089,243, Cl. 83-161.000.

Heers, Wolfgang: *See—*
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Heil, Donald J.; and Jaremus, Boubene M., to American Hospital Supply Corporation. Spring grip chuck assembly for dental handpieces. 4,089,115, Cl. 32-27.000.

Heim, Ulrich, to Dragerwerk Aktiengesellschaft. Method and arrangement for determining alcohol content in the breath. 4,090,078, Cl. 250-343.000.

Heine, Hans Gunther; and Hochstrasser, Otto, to Brown Boveri Corporation. Electrical preheating apparatus. 4,090,054, Cl. 219-10.49R.

Heinze, Christoph, to Hoechst Aktiengesellschaft. Process and device for the thermal treatment of a mixture of finely divided solids and gases. 4,089,119, Cl. 34-10.000.

Heinze, Christoph: *See—*
Scheibler, Hermann; Ruchlak, Kasimir; Heinze, Christoph; and Wolff, Horst, 4,090,014, Cl. 526-62.000.

Heisler, Raymond A. Apparatus and method for case packing small containers and articles. 4,089,150, Cl. 53-29.000.

Heiss, John Herbert, Jr.; and Wylie, John Robert, to Bell Telephone Laboratories, Incorporated; and Western Electric Company Inc. Removal of RTV silicon rubber encapsulants. 4,089,704, Cl. 134-29.000.

Heitman, Leroy Marvin. Clamp for hydraulic hoses. 4,089,087, Cl. 24-81.0TH.

Helfgott, Samson: *See—*
Benjamin, Jack W.; and Helfgott, Samson, 4,090,037, Cl. 179-90.0AN.

Heller, Carl A.; Richter, Herbert P.; and Marcus, Rudolph J., to United States of America, Navy. Chemiluminescent warning capsules. 4,089,797, Cl. 252-188.3CL.

Hendrickson, Thomas E.; Huang, Jack S. T.; and Tetzlaff, Wolfgang, to Honeywell Inc. Monolithic integrated circuit device construction methods. 4,089,103, Cl. 29-577.00C.

Hengst, Bernd: *See—*
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Henkel Kommanditgesellschaft auf Aktien: *See—*
Christophliemk, Peter; Worms, Karl-Heinz; and Schreiber, Gerald, 4,089,929, Cl. 423-118.000.

Hensel, Werner: *See—*
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Henson, Ralph B.; and Wiggins, Noel D., to Caterpillar Tractor Co. Anti-rotating guide for reciprocating members. 4,089,234, Cl. 74-569.000.

Hepworth, Edward C.; and Means, Rodney J., to Motorola, Inc. First-in-first-out register implemented with single rank storage elements. 4,090,256, Cl. 365-154.000.

Herb, Eugen; and Bitzel, Hubert, to Trumpf Maschinen AG. Stamping or nibbling machine having a workpiece feed operable in accordance with the weight and center of gravity of the workpiece. 4,089,244, Cl. 83-220.000.

Herman, Donald L.: *See—*
Kittrell, James R.; and Herman, Donald L., 4,089,930, Cl. 423-239.000.

Hermanson, William A. Contact lens location finder. 4,089,552, Cl. 294-1.0CA.

Hermecz, Istvan: *See—*
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Heroux, George Armand. Application of siding, shingles or shakes to a wall structure. 4,089,141, Cl. 52-105.000.

Herr, Roy Wilbur: *See—*
Tremmel, Robert Arnold; and Herr, Roy Wilbur, 4,089,754, Cl. 204-43.00T.

Herrmann, Eric Peter, to RCA Corporation. Charge coupled device with diode reset for floating gate output. 4,090,095, Cl. 307-221.00D.

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Itil, Turan M.; Laudahn, Gerhard; and Herrmann, Werner Martin, 4,089,952, Cl. 424-243.000.

Hesener, Walter. Spring type article projecting device. 4,089,318, Cl. 124-16.000.

Hess, Otto; Dokter, Heinz; and Scherzinger, Werner, to Mayer & Cie., GmbH. & Co., Firma. Apparatus for the manufacture of reinforced panties. 4,089,279, Cl. 112-121.120.

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Berger, Horst H.; Heuber, Klaus; Klein, Wilfried; Najmann, Knut; and Wiedmann, Siegfried, 4,090,255, Cl. 365-154.000.

Heyduk, Gerhard: *See—*
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Hibbard, George A., to Joy Manufacturing Company. Hammer having fluid biased work member. 4,089,380, Cl. 173-133.000.

Hibbs, David Arthur: *See—*
Theodossi, Charalambos Georgiou; and Hibbs, David Arthur, 4,089,923, Cl. 264-146.000.

Higo, Moriaki; Saga, Hitoshi; Watanabe, Yoji; and Suzuki, Kunitomo, to Lion Dentifrice Co., Ltd., The. Process for preparation of β-bourbonene. 4,089,764, Cl. 204-162.00R.

Hildebrand, Otto; Link, Christoph; Reutter, Siegfried; and Stotz, Wolf-Gunter, to Escher Wyss GmbH. Head box having guide block and adjustable slice plates. 4,089,739, Cl. 162-343.000.

Hill, Homer; and Dunn, Alfred L., to Dover Corporation. Injector pump. 4,089,626, Cl. 417-431.000.

Hillman, Theodore Eugene, to Conwed Corporation. Apparatus for applying secondary layer on board surface. 4,089,740, Cl. 162-304.000.

Hindin, Saul G.: *See—*
Polinski, Leon M.; Roberts, George W.; and Hindin, Saul G., 4,089,654, Cl. 23-288.0FC.

Hinkle, Francis E., Jr., to United States of America, Navy. Frequency multiplexed water leak detection system. 4,090,193, Cl. 340-412.000.

Hirano, Hirotoshi: *See—*
Arai, Izumi; Yamada, Yasuteru; Mutsuta, Akio; Hirano, Hirotoshi; and Tuchida, Yasuzou, 4,089,507, Cl. 366-102.000.

Hirano, Toru, to Hokushin Electric Works, Ltd. System for monitoring flow rate difference in water cooling conduit. 4,090,179, Cl. 340-242.000.

Hirosawa, Koichiro: *See—*
Murakami, Noboru; Hirosawa, Koichiro; Ohara, Kazuo; and Matsuo, Koichi, 4,089,239, Cl. 74-761.000.

Hirose, Hisashi: *See—*
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Hirozawa, Stanley Tariho: *See—*
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Hitachi, Ltd.: *See—*
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Sasamoto, Asao; and Amano, Hideaki, 4,090,117, Cl. 318-365.000.

Hitachi Medical Corporation: *See—*
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Hitachi Shipbuilding & Engineering Co., Ltd.: *See—*
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Ho, Irving Tze; and Riseman, Jacob, to International Business Machines Corporation. Charge injector transistor memory. 4,090,254, Cl. 365-150.000.

Hoadley, Howard W. Non-contact digital contour generator. 4,089,608, Cl. 356-156.000.

Hochstrasser, Otto: *See*—
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Braun, Helmut; Rinno, Helmut; Reinecke, Rolf; Stelzel, Werner; and Winstel, Wolfgang, 4,089,829, Cl. 260-29.60T.
Heinze, Christoph, 4,089,119, Cl. 34-10.000.
Mondt, Josef; Rauterkus, Karl Josef; Lehmann, Heinz; Stelzel, Werner; and Vitzthum, Hans, 4,089,999, Cl. 427-385.00R.
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Hoex-Strik, Francisca Maria Johanna Henrica: *See*—
Sommerdijk, Johannes Leonardus; and Hoex-Strik, Francisca Maria Johanna Henrica, 4,089,799, Cl. 252-301.40H.
Hofen, Willi; Schreyer, Gerd; Wirthwein, Rolf; Waldmann, Helmut; and Siekmann, Gerd, to Deutsche Gold-und Silberscheideanstalt Vormals Roessler; and Bayer Aktiengesellschaft. Process for the preparation of percarboxylic acid solutions. 4,089,892, Cl. 260-502.00R.
Hoffa, Jack L., to Beckman Instruments, Inc. Magnetic mixing apparatus. 4,090,263, Cl. 366-273.000.
Hoffman Engineering Corporation: *See*—
McCarter, Craig A., 4,090,071, Cl. 250-238.000.
Hoffman, William C.: *See*—
Ernstoff, Michael N.; Hoffman, William C.; and Winner, Richard N., 4,090,219, Cl. 358-59.000.
Hoffmann, Arthur Kentaro: *See*—
Raghu, Sivaraman; Hoffmann, Arthur Kentaro; and Singh, Balwant, 4,090,025, Cl. 548-320.000.
Hoffmann-La Roche Inc.: *See*—
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Bohni, Erika; and Montavon, Marc, 4,089,950, Cl. 424-229.000.
Jaunin, Roland, 4,089,875, Cl. 260-326.100.
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Kienzle, Frank; and Rosen, Perry, 4,089,889, Cl. 260-464.000.
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Hofmann, Robert Lee: *See*—
Chutter, Raymond Allen; Green, Paul James; Hofmann, Robert Lee; and Long, Daniel Rose, 4,089,437, Cl. 222-94.000.
Hofmann, Rudolf, Jr., to Sullair Schraubenkompressoren GmbH. Compressor intake control. 4,089,623, Cl. 417-295.000.
Hofmann, Rudolf, Jr., to Comprotek, S. A. Rotary gas machine. 4,089,625, Cl. 417-440.000.
Hoinski, Walter W., to Power Systems Development Corp. Dual battery charger with logic means. 4,090,122, Cl. 320-6.000.
Hokkanji, Sakae; Shimizu, Masami; Sunouchi, Akio; Iura, Yukio; Yamamichi, Masayoshi; and Watanabe, Yoshiaki, to Canon Kabushiki Kaisha. Film feeding device for camera. 4,089,483, Cl. 242-71.400.
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Holoubek, Verne Richard, to Holoubek Studios, Inc. Method of affixing heat transferrable indicia to a fabric surface. 4,089,722, Cl. 156-235.000.
Holt, Arthur W., to Videofax Communications Corporation. Video system for storing and retrieving documentary information. 4,090,223, Cl. 360-35.000.
Holyoak, Kenneth, to Crosland Filters Limited. Filter. 4,089,783, Cl. 210-358.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Yamazaki, Shuichi; and Shimada, Shinichi, 4,089,163, Cl. 60-282.000.
Yoshioka, Yuichi; and Nakano, Yoshikatsu, 4,089,914, Cl. 261-34.00A.
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Hendrickson, Thomas E.; Huang, Jack S. T.; and Tetzlaff, Wolfgang, 4,089,103, Cl. 29-577.00C.
Johnson, Eric Shanks, 4,089,713, Cl. 148-178.000.
Johnson, Eric Shanks; and Schmit, Joseph Lawrence, 4,089,714, Cl. 148-188.000.
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Honshu Seishi Kabushiki Kaisha: *See*—
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Hood, Larry L., to Quaker Oats Company, The. Color-stabilized semi-moist food and process. 4,089,983, Cl. 426-250.000.
Hooker Chemicals & Plastics Corp.: *See*—
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Hoover, Merle Vincent, to RCA Corporation. Complementary symmetry FET mixer circuits. 4,090,139, Cl. 325-451.000.
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Murata, Masahiro, 4,089,541, Cl. 280-631.000.
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Smith, Donald Arthur; and Horan, David Joseph, 4,089,637, Cl. 431-183.000.
Horii, Satoshi; Kameda, Yukihiko; Iwasa, Takashi; and Yamamoto, Hiroichi, to Takeda Chemical Industries Ltd. Antibiotic compositions containing validamycin compounds. 4,089,947, Cl. 424-181.000.
Horiike, Hideki: *See*—
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Hornbaker, Edwin D.; Jones, Jesse D.; Kucsma, Michael E.; and Allen, Thomas S., to Ethyl Corporation. Polypivalolactone molding compounds. 4,089,838, Cl. 260-40.00R.
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Houser, David Erle; and Morenus, Richard Jay, to International Business Machines Corporation. Orientation apparatus for multiple twisted wires. 4,089,452, Cl. 226-157.000.
Houston, Robert L., to Owens-Corning Fiberglas Corporation. Method for estimating and controlling the mass flow rate of a free falling fluid stream. 4,090,241, Cl. 364-473.000.
Howard, Bernard. Course indicator. 4,089,118, Cl. 33-349.000.
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Huard, Albert. Coin wrapper. 4,089,459, Cl. 229-87.200.
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Hubbard, Winchester Loomis: *See*—
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Huffman, Harold W.; Lyon, Richard H.; Holmes, David G.; and Donahue, John W., to Mead Corporation, The. Apparatus and method for jet drop printing. 4,090,205, Cl. 346-75.000.
Huffnagle, Clifton Wesley; and Ward, James Paul, to AMP Incorporated. Multi-contact connector and contact terminal for flat cable having a plurality of conductors on close center lines. 4,089,580, Cl. 339-99.00R.
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Hunziker, Heinrich Erwin; and Nesbet, Robert Kenyon, to International Business Machines Corporation. High resolution electron energy device and method. 4,090,076, Cl. 250-305.000.

Husbands, George E. M., to American Home Products Corporation. Prostaglandin derivatives. 4,089,885, Cl. 260-448.80R.
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Hydraroll Limited: *See—*
Webb, John Edmund Richard, 4,089,399, Cl. 193-35.0SS.
HydroTech International, Inc.: *See—*
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Ibbott, Jack Kenneth. Means for introducing additional air into air fuel stream of internal combustion engines. 4,089,312, Cl. 123-119.00D.
Ichikawa, Hiroki; and Kobayashi, Masao, to Olympus Optical Co., Ltd. Apparatus for tape recorder. 4,089,487, Cl. 242-186.000.
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Idemitsu Kosan Company, Ltd.: *See—*
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Idemitsu Petrochemical Co. Ltd.: *See—*
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Cooke, Brian Alfred, 4,089,710, Cl. 148-6.15Z.
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Dart, Edward Charles; Cantwell, John Burnett; Traynor, James Rodney; Jaworzyn, Joseph Franciszek; and Nemeck, Jozef, 4,089,763, Cl. 204-159.230.
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In Situ Technology, Inc.: *See—*
Terry, Ruel C., 4,089,372, Cl. 166-256.000.
Terry, Ruel C., 4,089,374, Cl. 166-259.000.
Inbody, Melvin R.: *See—*
Blood, John D.; and Inbody, Melvin R., 4,089,383, Cl. 180-43.00R.
Incontrol Industries Ltd.: *See—*
Koenig, Shulamith S., 4,089,471, Cl. 239-381.000.
Ing. C. Olivetti & C., S.p.A.: *See—*
Navone, Lorenzo, 4,089,601, Cl. 355-14.000.
Innovative Computer Products: *See—*
Sandor, Joseph; and Goode, Vern Evert, 4,089,414, Cl. 206-444.000.
Inoue, Hideo: *See—*
Takahashi, Ken; and Inoue, Hideo, 4,089,182, Cl. 61-45.00D.
Institut Fiziki Vysokikh Daleny Akademi Nauk, SSSR: *See—*
Vereschagin, Leonid Fedorovich; Yakovlev, Evgeny Nikolaevich; Varfolomeeva, Tatyana Dmitrievna; Preobrazhensky, Alexandr Yakovlevich; Slesarev, Vladislav Nikolaevich; Stepanov, Vasily Alexandrovich; and Shterenberg, Ljudmila Efimovna, 4,089,933, Cl. 423-446.000.
Institut Francais du Petrole: *See—*
Rojey, Alexandre; and Cohen, Georges, 4,089,186, Cl. 62-101.000.
International Business Machines Corporation: *See—*
Berger, Horst H.; Heuber, Klaus; Klein, Wilfried; Najmann, Knut; and Wiedmann, Siegfried, 4,090,255, Cl. 365-154.000.
Braun, Roland Joseph, 4,090,252, Cl. 365-2.000.
Chen, Tien Chi; Tung, Chin; and Lum, Vincent Y., 4,090,249, Cl. 364-900.000.
Colglazier, Donald Francis; Fallon, John Leslie; Kollar, Ernest Paul; and Mares, Fred Ralph, 4,089,516, Cl. 271-9.000.
Doo, Ven Y.; Nichols, Donald R.; and Silvey, Gene A., 4,089,992, Cl. 427-94.000.
Engler, Edward Martin; and Schumaker, Robert Rhees, 4,089,857, Cl. 260-293.560.
Havas, Janos; Lechaton, John S.; and Logan, Skinner, 4,090,006, Cl. 428-81.000.
Ho, Irving Tze; and Riseman, Jacob, 4,090,254, Cl. 365-150.000.
Houser, David Erle; and Morenus, Richard Jay, 4,089,452, Cl. 226-157.000.
Hunziker, Heinrich Erwin; and Nesbet, Robert Kenyon, 4,090,076, Cl. 250-305.000.
Joy, Richard C.; Magdo, Ingrid E.; and Phillips, Alfred, Jr., 4,089,712, Cl. 148-175.000.
Paal, Gabor; and Schackert, Klaus, 4,089,766, Cl. 204-192.00D.
Van Voorhis, David Curtis, 4,090,174, Cl. 340-146.3MA.
International Flavors & Fragrances Inc.: *See—*
Light, Kenneth K.; Vock, Manfred Hugo; Shuster, Edward J.; and Schmitt, Frederick Louis, 4,089,986, Cl. 426-538.000.
International Harvester Company: *See—*
Scholz, Helmut, 4,089,237, Cl. 74-681.000.
International Standard Electric Corporation: *See—*
Denton, Norman; and Harding, Andrew Baxter, 4,089,550, Cl. 285-276.000.
Knight, Alan Clifford, 4,089,495, Cl. 246-34.00R.
International Telephone & Telegraph Corporation: *See—*
Bradford, George J., 4,089,462, Cl. 236-68.00B.
Sawyer, Edgar W., Jr., 4,089,669, Cl. 71-11.000.
Theodossi, Charalambos Georgiou; and Hibbs, David Arthur, 4,089,923, Cl. 264-146.000.
Inturrisi, Charles E.: *See—*
Chatterjie, Nithianandа; and Inturrisi, Charles E., 4,089,855, Cl. 260-285.000.
Iowa Manufacturing Company: *See—*
Fairchild, Louis F.; Jones, Harlan M.; and Schrimper, Vernon L., 4,089,616, Cl. 404-117.000.
Iowa State University Research Foundation, Inc.: *See—*
Brockman, William Harry; and Cannata, Robert Frank, 4,089,589, Cl. 350-162.0SF.
Irick, Gether, Jr.; and Kelly, Charles A., to Eastman Kodak Company. 1,3,4-Thiadiazol-2,5-diyl-bis-benzoic acid esters. 4,089,874, Cl. 260-302.00D.
Ishida, Masahiko: *See—*
Takiura, Mamoru; Nakajyo, Susumu; Kikuchi, Noriyuki; and Ishida, Masahiko, 4,089,917, Cl. 264-40.300.
Ishida, Mitsuo, to Giken Co., Ltd. Automatic flow control valve assembly. 4,089,343, Cl. 137-484.800.
Ishidoshiro, Hiroshi: *See—*
Sando, Yoshikazu; Minakata, Matsuo; Ishidoshiro, Hiroshi; Tomatsu, Masanobu; and Kamei, Isao, 4,089,194, Cl. 68-5.00E.
Ishigaki, Kunio: *See—*
Shimiya, Keiji; Miura, Norio; Takano, Masao; and Ishigaki, Kunio, 4,090,085, Cl. 250-483.000.
Ishii, Ko; and Yoshida, Tadamasa, to Sumitomo Bakelite Company, Limited. Adhesive comprising post-chlorinated polyethylene and polyvinyl chloride. 4,089,726, Cl. 156-306.000.
Ishimatsu, Kenji: *See—*
Takami, Katsumi; Ueda, Ken; Kawaguchi, Fumio; Tomura, Teruichi; and Ishimatsu, Kenji, 4,090,081, Cl. 250-368.000.
Isikawa, Kiyosi. Tape transport apparatus. 4,089,488, Cl. 242-192.000.
Itek Corporation: *See—*
Jacobs, Robert D., 4,089,603, Cl. 355-73.000.
Itil, Turan M.; Laudahn, Gerhard; and Herrmann, Werner Martin, to Schering Aktiengesellschaft. Neuropsychotropic agents and their use. 4,089,952, Cl. 424-243.000.
Ito, Fumio: *See—*
Shinoda, Nobuhiko; Ito, Tadashi; Nakamoto, Soichi; and Ito, Fumio, 4,090,208, Cl. 354-38.000.
Ito, Hideo: *See—*
Sugiyama, Hironari; Chiyomaru, Isao; Okuda, Itsuki; Yamamoto, Hisaaki; and Ito, Hideo, 4,089,964, Cl. 424-270.000.
Ito, Tadashi: *See—*
Mashimo, Yukio; and Ito, Tadashi, 4,090,207, Cl. 354-23.00D.
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Ito, Yoshio; Katayama, Hajime; Nitanda, Hiroshi; and Yamaguchi, Masaru, to Canon Kabushiki Kaisha. Corona discharge device for electrophotographic copying machine. 4,089,600, Cl. 355-3.0CH.
Itoh, Yoshio; Satoh, Kakuji; Suzuki, Yuji; Miura, Yasuo; Kazama, Yoshiteru; and Yazawa, Saburo, to Kao Soap Co., Ltd.; and Sankyo Organic Chemicals Co., Ltd. Process for improving the thermal stability of polyurethane-containing resin composition. 4,089,911, Cl. 260-859.0PV.
ITT Industries, Incorporated: *See—*
Alexander, John Henry, 4,089,813, Cl. 252-520.000.
ITW-Ateco G.m.b.H.: *See—*
Schenk, Bernd, 4,089,349, Cl. 137-859.000.
ITW de France, S.A.: *See—*
Nivet, Andre, 4,089,099, Cl. 29-243.530.
ITW Limited: *See—*
Harley, David N., 4,089,614, Cl. 403-407.000.
Iura, Yukio: *See—*
Hokkanji, Sakae; Shimizu, Masami; Sunouchi, Akio; Iura, Yukio; Yamamichi, Masayoshi; and Watanabe, Yoshiaki, 4,089,483, Cl. 242-71.400.

Ivanov, Mikhail Alexandrovich: *See—*
Tischenko, Alexandr Fedorovich; Yanishevsky, Nisson Meerovich; and Ivanov, Mikhail Alexandrovich, 4,089,210, Cl. 73-63.000.

Iwakura, Tatsuya: *See—*
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Iwasa, Takashi: *See—*
Horii, Satoshi; Kameda, Yukihiko; Iwasa, Takashi; and Yamamoto, Hiroichi, 4,089,947, Cl. 424-181.000.

Iwasa, Yoshio, to Nissan Motor Company, Limited. Manifold system. 4,089,164, Cl. 60-282.000.

Iwasawa, Naozumi: *See—*
Shibata, Minoru; Iwasawa, Naozumi; Watanabe, Tadashi; and Yoshihara, Ichiro, 4,089,910, Cl. 260-836.000.

Iwasyk, John Maurice, to Du Pont de Nemours, E. I., and Company. Apparatus for finishing high viscosity synthetic polymers. 4,090,261, Cl. 366-83.000.

J.M.J. Electronics, Inc.: *See—*
Silverstein, Milton M., 4,090,033, Cl. 179-1.0AT.

Jackson, John Harry: *See—*
Barkman, Erick F.; Jackson, John Harry; and Ward, Bennie Ray, Jr., 4,090,011, Cl. 428-653.000.

Jackson, Peter, to Imperial Chemical Industries Limited. Formulation of feed additives, mineral supplements and liquid feeds for animals and preservatives for silage, hay and grain. 4,089,979, Cl. 426-69.000.

Jackson, Richard R. Self-sterilizing humidifier. 4,089,915, Cl. 261-39.00R.

Jacob, Hermann. Apparatus for purifying particulate mould material. 4,089,081, Cl. 15-93.00R.

Jacobs, Eli S.: *See—*
Russell, James T., 4,090,031, Cl. 358-130.000.

Jacobs, Robert D., to Itek Corporation. Apparatus for supporting a printing plate for exposure. 4,089,603, Cl. 355-73.000.

Jacquemet, Andre: *See—*
Baumgartner, Henri; Jacquemet, Andre; Meier, John George; and Vollerin, Bernard, 4,089,629, Cl. 431-9.000.

Jager, Horst, to Bayer Aktiengesellschaft. 1-Amino-4-methoxybenzene-2,5-disulfonic acid. 4,089,895, Cl. 260-509.000.

Jakubowski, Thaddeus, Jr.; and Kietzman, Herman R., Jr., to McDonnell Douglas Corporation. Cartridge holder with extractor/indicator. 4,089,250, Cl. 89-1.50F.

James, Bobby D.: *See—*
Simpson, Ronald O.; Starling, J. David; James, Bobby D.; Godin, Thomas John; Ginsberg, Guenter; and Drbal, Vladimir J., 4,090,128, Cl. 324-71.0CP.

Jamieson, Geoffrey A.: *See—*
Ciko, John D.; Cramer, John J.; and Jamieson, Geoffrey A., 4,089,786, Cl. 252-8.800.

Jamieson, William Boffey: *See—*
Harrison, Roger Garrick; Jamieson, William Boffey; Ross, William James; and Saunders, John Christopher, 4,089,962, Cl. 424-269.000.

Jancis, Elmar Harry, to Uniroyal, Inc. 5-Chloro-2-(2'-hydroxy-5'-tert-octylphenyl)benzotriazole and polypropylene stabilized therewith. 4,089,839, Cl. 260-45.8NT.

Japan Atomic Energy Research Institute: *See—*
Kinbara, Setsuro, 4,090,191, Cl. 340-347.0AD.

Jaremus, Boubene M.: *See—*
Heil, Donald J.; and Jaremus, Boubene M., 4,089,115, Cl. 32-27.000.

Jaroska, Miles F.; Niven, William A.; and Morrison, Jasper J., to United States of America, Energy. Safe arming system for two-explosive munitions. 4,089,268, Cl. 102-70.20R.

Jaunin, Roland, to Hoffmann-La Roche Inc. Process and intermediates for isoindole derivatives. 4,089,875, Cl. 260-326.100.

Jaunin, Roland, to Hoffmann-La Roche Inc. Isoindole derivatives. 4,090,027, Cl. 560-52.000.

Jaworzyn, Joseph Franciszek: *See—*
Dart, Edward Charles; Cantwell, John Burnett; Traynor, James Rodney; Jaworzyn, Joseph Franciszek; and Nemeck, Jozef, 4,089,763, Cl. 204-159.230.

Jeanguenin, Claude; and Jeannot, Michel, to Societe Suisse pour l'Industrie Horrlogere (SSIH) Management Services S.A. Method of suspending electrical components. 4,089,092, Cl. 29-25.350.

Jeannot, Michel: *See—*
Jeanguenin, Claude; and Jeannot, Michel, 4,089,092, Cl. 29-25.350.

Jenik, Franz; and Wentzel, Peter, to Siemens Aktiengesellschaft. Circuit arrangement for recognizing zero transitions of signals. 4,090,144, Cl. 328-150.000.

Jenkins, William Bernard, to Reynolds Metals Company. Soldered tube end. 4,089,453, Cl. 228-154.000.

Jennings, Charles E., to Aluminum Company of America. Packing gland for cell tapping tube. 4,089,769, Cl. 204-245.000.

Jennings, James Robert; and Kelly, Lawrence Francis Michael, to Imperial Chemical Industries Limited. Process for the dimerization of acrylonitrile. 4,089,890, Cl. 260-465.80D.

Jensen, Warner, Jr.: *See—*
Klingler, Thomas C.; Schmidt, Donald L.; Jensen, Warner, Jr.; and Urchick, Demetrius, 4,089,877, Cl. 260-332.30R.

Jenson, David W.: *See—*
Morton, James L.; Birchell, Thomas H.; Noble, James M.; and Jenson, David W., 4,089,509, Cl. 366-8.000.

Jerabek, Charles F.; Parent, Edward D.; and Smith, Harold W., to GTE Sylvania Incorporated. Self-resistance-heated evaporation boat. 4,089,643, Cl. 432-262.000.

Jeschke, Willi; and Pfizenmaier, Wolfgang, to Heidelberger Druckmaschinen Aktiengesellschaft. Inking unit for printing machines. 4,089,264, Cl. 101-365.000.

John, Willy, to Gebruder Netzsch, Maschinenfabrik. Agitator mill. 4,089,473, Cl. 241-41.000.

John Zink Company: *See—*
Hampton, J. D., 4,089,454, Cl. 228-173.00A.
Reed, Robert D.; and McGill, Eugene C., 4,089,639, Cl. 431-211.000.

Johnson, Eric Shanks, to Honeywell Inc. Diffusion of donors into (Hg Cd) Te through use of Ga-Al alloy. 4,089,713, Cl. 148-178.000.

Johnson, Eric Shanks; and Schmit, Joseph Lawrence, to Honeywell Inc. Doping mercury cadmium telluride with aluminum or silicon. 4,089,714, Cl. 148-188.000.

Johnson, Gordon Carlton, to Union Carbide Corporation. Composition for improving flame retardancy properties of textile fibers. 4,089,785, Cl. 252-8.100.

Johnson, Howard L., to Caterpillar Tractor Co. Power conservation means for variable displacement pump fluid supply system. 4,089,170, Cl. 60-445.000.

Johnson & Johnson: *See—*
Turner, Robert B., 4,090,064, Cl. 235-92.0MT.

Johnson, Leonard L., to Teco, Inc. Fluid control system. 4,089,388, Cl. 182-2.000.

Johnson, Matthey & Co., Limited: *See—*
Diwell, Alan Francis; and Evans, William David James, 4,089,810, Cl. 252-462.000.

Johnson, Richard A.: *See—*
Carlson, Curtis E.; Johnson, Richard A.; and Spignese, Edward E., 4,090,250, Cl. 364-900.000.

Johnson, Richard Calvin; and Kulbida, Ihor, to Xerox Corporation. Interface system to control flash lamp. 4,090,108, Cl. 315-158.000.

Johnson, Richard N.: *See—*
Kraska, Irvin R.; Mathieson, Thomas A.; Johnson, Richard N.; Lichodziejewski, Wieslaw L.; Gamache, David Leo; and Ash, Leon, 4,089,225, Cl. 73-614.000.

Johnson, William E.: *See—*
Ryan, William H.; and Johnson, William E., 4,090,109, Cl. 315-169.0TV.

Johnston, Paul M., to Westinghouse Electric Corp. Automatic transfer control device and frequency monitor. 4,090,090, Cl. 307-87.000.

Jones, Harlan M.: *See—*
Fairchild, Louis F.; Jones, Harlan M.; and Schrimper, Vernon L., 4,089,616, Cl. 404-117.000.

Jones, Jerry J. Mud and snow tire cleats. 4,089,359, Cl. 152-216.000.

Jones, Jesse D.: *See—*
Hornbaker, Edwin D.; Jones, Jesse D.; Kucsma, Michael E.; and Allen, Thomas S., 4,089,838, Cl. 260-40.00R.

Jones, Thomas Ivor: *See—*
Harris, Arthur; Burrows, John; and Jones, Thomas Ivor, 4,089,796, Cl. 252-181.000.

Jonsson, Kjartan A., to Sun-Econ, Inc. Heat extraction or reclamation apparatus for refrigerating and air conditioning systems. 4,089,667, Cl. 62-238.000.

Jonsson, Knut, to AB Wicanders Korkfabriker. Closure for a container. 4,089,433, Cl. 215-218.000.

Jonsson, Nils Ake, to AB Kabi. Therapeutic compositions against recurrent thrombosis. 4,089,957, Cl. 424-248.560.

Jornod, Eugene R., to Barber-Colman Company. Thermal printhead control circuit. 4,090,060, Cl. 219-216.000.

Joy Manufacturing Company: *See—*
Hibbard, George A., 4,089,380, Cl. 173-133.000.

Joy, Richard C.; Magdo, Ingrid E.; and Phillips, Alfred, Jr., to International Business Machines Corporation. Epitaxial process for the fabrication of a field effect transistor having improved threshold stability. 4,089,712, Cl. 148-175.000.

Junttila, David W. Position controller. 4,089,172, Cl. 60-567.000.

K-tron Corporation: *See—*
Bullivant, Kenneth W., 4,089,407, Cl. 198-815.000.

Kabushibi Kaisha Kobe Seikosho: *See—*
Matsuno, Yoshiyuki; Nohara, Tomiyasu; Komatsu, Fumiaki; and Imanishi, Nobuyuji, 4,089,284, Cl. 114-26.000.

Kabushiki Kaisha Daini Seikosha: *See—*
Mori, Shigeo; Murakami, Fumikazu; Hara, Yoshiaki; Horikoshi, Ichiro; and Takahashi, Souya, 4,090,041, Cl. 179-115.00R.

Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo: *See—*
Furuya, Tsutomu; Ayabe, Shinichi; Kobayashi, Miyuki; and Tanimoto, Tadao, 4,089,606, Cl. 536-4.000.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Mizumoto, Masakatsu; and Yamashita, Hisateru, 4,089,205, Cl. 72-450.000.

Kabushiki Kaisha Nagaoka: *See—*
Kawabe, Hirokazu; and Tanabe, Hiroshi, 4,089,530, Cl. 274-37.000.

Kabushiki Kaisha Takenaka Doboku: *See—*
Endo, Masaaki; Miura, Mitsuo; and Kukino, Yoshinori, 4,089,183, Cl. 61-50.000.

Kabushiki Kaisha Takenaka Komuten: *See—*
Endo, Masaaki; Miura, Mitsuo; and Kukino, Yoshinori, 4,089,183, Cl. 61-50.000.

Kachadorian, James. Solar-heated concrete slab building structure. 4,089,142, Cl. 52-169.110.

Kaira, Lauri Olavi, to Valmet Oy. Press roll with controllable deflection. 4,089,094, Cl. 29-116.0AD.

Kaiser, Carl; and Lafferty, John Joseph, to SmithKline Corporation. Antipsychotically useful quinolizidylidene derivatives of xanthenes, thioxanthenes and dibenzoxepins. 4,089,961, Cl. 424-267.000.

Kalal, Jaroslav; and Svec, Frantisek, to Ceskoslovenska akademie ved. Aldehyde polymers from periodic acid treatment of epoxide polymers. 4,089,823, Cl. 260-23.0EP.

Kalaus, Gyorgy: *See—*
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,089,856, Cl. 260-293.530.
Kali-Chemie Pharma GmbH: *See—*
Thies, Peter Willibrord; and Asai, Akiji, 4,089,971, Cl. 424-278.000.
Kalnberz, Viktor Konstantinovich; Yanson, Kharald Arnoldovich; Knets, Ivar Valterovich; and Saulgozis, Jury Zhanovich. Material for making bone endoprosthesis and endoprosthesis made of said material. 4,089,071, Cl. 3-1.900.
Kameda, Yukihiko: *See—*
Horii, Satoshi; Kameda, Yukihiko; Iwasa, Takashi; and Yamamoto, Hiroichi, 4,089,947, Cl. 424-181.000.
Kamei, Isao: *See—*
Sando, Yoshikazu; Minakata, Matsuo; Ishidoshiro, Hiroshi; Tomatsu, Masanobu; and Kamei, Isao, 4,089,194, Cl. 68-5.00E.
Kamp, Heinz, to W. Schlafhorst & Co. Winding apparatus for friction-driven conical cross-wound coils. 4,089,480, Cl. 242-18.0DD.
Kamyshnikov, Arkady Ivanovich; Rutitsky, Alexandr Isaakovich; Speransky, Vladimir Mikhailovich; and Danin, Boris Konstantinovich. Blowout preventer ram assembly. 4,089,532, Cl. 277-129.000.
Kan, Ryuzo: *See—*
Kotera, Hiroaki; Hayami, Heijiro; Tsuchiya, Hiroyoshi; Kan, Ryuzo; Yoshida, Kunio; Shibata, Tsutomu; and Tsuda, Yukifumi, 4,090,243, Cl. 364-526.000.
Kane, Vinayak V., to Ortho Pharmaceutical Corporation. Method for reacting 2-aromatic substituted 1,3-dithianes with α,β-unsaturated ketones to selectively produce 1,4- or 1,2-addition products and the products made thereby. 4,089,876, Cl. 260-327.00M.
Kaneko, Ichiro: *See—*
Koyanagi, Shunichi; Hasegawa, Niichiro; Shimizu, Toshihide; Kaneko, Ichiro; and Katsushima, Sensaku, 4,090,015, Cl. 526-62.000.
Kaneyasu, Masao, to Dentsu Central Kabushiki Kaisha. Container for positioning a disinfectant-impregnated member in a telephone mouthpiece. 4,090,044, Cl. 179-185.000.
Kankaanpaa, Matti, to Valmet Oy. Method and apparatus for influencing the characteristics of the surface of a paper product. 4,089,738, Cl. 162-206.000.
Kansai Paint Co., Ltd.: *See—*
Shibata, Minoru; Iwasawa, Naozumi; Watanabe, Tadashi; and Yoshihara, Ichiro, 4,089,910, Cl. 260-836.000.
Kao Soap Co., Ltd.: *See—*
Itoh, Yoshio; Satoh, Kakuji; Suzuki, Yuji; Miura, Yasuo; Kazama, Yoshiteru; and Yazawa, Saburo, 4,089,911, Cl. 260-859.0PV.
Karamian, Narbik A., to United States of America, Health, Education and Welfare. Apparatus for producing high-purity water. 4,089,749, Cl. 202-176.000.
Karasawa, Yoshimitsu: *See—*
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Karpati, Egon: *See—*
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,089,856, Cl. 260-293.530.
Karpp, Heinrich. Utility tool. 4,089,111, Cl. 30-154.000.
Kashio, Toshio, to Casio Computer Co., Ltd. Stop watch device. 4,089,156, Cl. 58-39.500.
Kataoka, Shoei: *See—*
Tateno, Hiroshi; Kataoka, Shoei; Hashizume, Nobuo; and Komamiya, Yasuo, 4,090,155, Cl. 333-80.00T.
Katayama, Hajime: *See—*
Ito, Yoshio; Katayama, Hajime; Nitanda, Hiroshi; and Yamaguchi, Masaru, 4,089,600, Cl. 355-3.0CH.
Kathawala, Faizulla G., to Sandoz, Inc. Substituted methanols. 4,089,908, Cl. 260-613.00D.
Kato, Yasuyuki; Moritani, Masahiko; and Suzuki, Seiichi, to Sumitomo Chemical Company, Limited. Process for the continuous casting of liquid polymerizable compositions. 4,089,918, Cl. 264-40.700.
Katsushima, Sensaku: *See—*
Koyanagi, Shunichi; Hasegawa, Niichiro; Shimizu, Toshihide; Kaneko, Ichiro; and Katsushima, Sensaku, 4,090,015, Cl. 526-62.000.
Katyshev, Georgy Viktorovich: *See—*
Lipets, Adolf Usherovich; Moskvichev, Viktor Fedorovich; Katyshev, Georgy Viktorovich; Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Shamarokova, Raisa Nikiforovna; Dolgy, Alexei Arsentievich; Eletsky, Stanislav Alexandrovich; Grinberg, Yakov Natanovich; Ardamatsky, Vitaly Andreevich; Vivsik, Svyatoslav Nikolaevich; Zavedeev, Vasily Evdokimovich; Zevin, Ilya Julievich; and Fadeev, Evgeny Alexeevich, 4,089,369, Cl. 165-158.000.
Katz, Howard G.: *See—*
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Kawabe, Hirokazu; and Tanabe, Hiroshi, to Kabushiki Kaisha Nagaoka. Phonographic stylus. 4,089,530, Cl. 274-37.000.
Kawaguchi, Fumio: *See—*
Takami, Katsumi; Ueda, Ken; Kawaguchi, Fumio; Tomura, Teruichi; and Ishimatsu, Kenji, 4,090,081, Cl. 250-368.000.
Kawai, Hisasi: *See—*
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Kawano, Susumu: *See—*
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Kayce, Inc.: *See—*
Larkin, Wallace Keith, 4,090,042, Cl. 179-156.00A.
Kazama, Yoshiteru: *See—*
Itoh, Yoshio; Satoh, Kakuji; Suzuki, Yuji; Miura, Yasuo; Kazama, Yoshiteru; and Yazawa, Saburo, 4,089,911, Cl. 260-859.0PV.
Keaney, John D.: *See—*
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Keen, Everett M.; and Siciliano, Anthony J., to Diamond International Corporation. Auger assembly for use in feed dispensing hoppers. 4,089,300, Cl. 119-52.0AF.
Keller Corporation, The: *See—*
Keller, Leonard James, 4,089,657, Cl. 44-51.000.
Keller, Douglas V., Jr.: *See—*
Smith, Clay D.; and Keller, Douglas V., Jr., 4,089,340, Cl. 137-13.000.
Keller, Leonard James, to Keller Corporation, The. Stabilized suspension of carbon in hydrocarbon fuel and method of preparation. 4,089,657, Cl. 44-51.000.
Keller, Louis J.: *See—*
Loegering, George A.; and Keller, Louis J., 4,089,565, Cl. 305-45.000.
Kellner, Eckhard: *See—*
Kemmer, Josef; and Kellner, Eckhard, 4,089,185, Cl. 62-55.500.
Kelly, Charles A.: *See—*
Irick, Gether, Jr.; and Kelly, Charles A., 4,089,874, Cl. 260-302.00D.
Kelly, Lawrence Francis Michael: *See—*
Jennings, James Robert; and Kelly, Lawrence Francis Michael, 4,089,890, Cl. 260-465.80D.
Kemmer, Frank N.: *See—*
Svarz, Jerry J.; Kemmer, Frank N.; and Fabri, Jon O., 4,089,780, Cl. 210-53.000.
Kemmer, Josef; and Kellner, Eckhard, to Kellner, Eckhard, a part interest. High vacuum pump system. 4,089,185, Cl. 62-55.500.
Ken, Victor: *See—*
Askienazy, Alexandre; Ken, Victor; and Souchet, Jean-Claude, 4,089,708, Cl. 148-6.15R.
Kendall Company, The: *See—*
Hartigan, Edward G.; and Patience, Donald, 4,089,331, Cl. 128-132.00D.
Swallow, Roger T., 4,089,068, Cl. 2-76.000.
Kenwood Manufacturing Company Limited: *See—*
Collie, Arthur Alexander; Charles, Barry Graham; Barnett, Edward Charles; and Ramshaw, Jack, 4,089,478, Cl. 241-167.000.
Kersten, Ralf: *See—*
Auracher, Franz; and Kersten, Ralf, 4,089,583, Cl. 350-96.150.
Kewanee Industries: *See—*
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,089,977, Cl. 424-329.000.
Khomenko, Alexandr Dmitrievich: *See—*
Polsky, Jury Mikhailovich; Zakharov, Valentin Petrovich; Golets, Nikolai Trofimovich; Tayakin, Jury Vasilievich; Lipovetsky, Gennady Petrovich; Protsenko, Valery Vasilievich; Khomenko, Alexandr Dmitrievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich, 4,090,246, Cl. 364-736.000.
Kiefer, Jurg: *See—*
Haug, Theobald; Kiefer, Jurg; Ruf, Peter; and Schmitter, Andre, 4,089,845, Cl. 260-78.00A.
Kielhorn, Werner; Heyduk, Gerhard; and Hochstrasser, Otto, to Brown, Boveri & Cie Aktiengesellschaft. Conductive heating device. 4,090,058, Cl. 219-156.000.
Kienzle, Frank; and Rosen, Perry, to Hoffmann-La Roche Inc. Synthesis of cyclopentanol. 4,089,889, Cl. 260-464.000.
Kietzman, Herman R., Jr.: *See—*
Jakubowski, Thaddeus, Jr.; and Kietzman, Herman R., Jr., 4,089,250, Cl. 89-1.50F.
Kikuchi, Noriyuki: *See—*
Takiura, Mamoru; Nakajyo, Susumu; Kikuchi, Noriyuki; and Ishida, Masahiko, 4,089,917, Cl. 264-40.300.
Kilby, Jack S.; Schweitzer, Robert F.; and McCrady, John, to Texas Instruments Incorporated. Thermal recording head for printer. 4,090,059, Cl. 219-216.000.
Killinger, John J., administrator: *See—*
Kornis, Gabriel; Nidy, Eldon G.; Vostral, Henry J.; and Steinhards, Arnolds, deceased, 4,089,672, Cl. 71-92.000.
Kimball International, Inc.: *See—*
Dietrich, Ralph Nowack, 4,089,245, Cl. 84-1.030.
Kimstock, Inc.: *See—*
Stobar, Leonard T., 4,089,556, Cl. 296-78.100.
Kimura, Kiyoshi: *See—*
Morita, Shizuo; and Kimura, Kiyoshi, 4,089,297, Cl. 118-647.000.
Kinase, Takeo; Yano, Isamu; Okubo, Kanichi; Kitakoga, Hidetoshi; and Tayama, Hiromitsu, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for deploying and taking up an oil fence. 4,089,178, Cl. 61-1.00F.
Kinbara, Setsuro, to Japan Atomic Energy Research Institute. Counting circuit system for time-to-digital converter. 4,090,191, Cl. 340-347.0AD.
Kindig, Alan L., to General Electric Company. Strip material feed roller assembly. 4,089,254, Cl. 93-1.00R.
King, Frederick David, to Northern Telecom Limited. Apparatus for manufacturing an optical fibre with plasma activated deposition in a tube. 4,090,055, Cl. 219-10.55R.
Kirkendall, Dennis, to Denmar, Stephen A. Antenna system. 4,089,817, Cl. 343-713.000.

Kirschman, Fred C.; and Bolte, Wallace B. Water distiller with cone shaped condenser. 4,089,750, Cl. 202-180.000.

Kitakoga, Hidetoshi: *See—*
Kinase, Takeo; Yano, Isamu; Okubo, Kanichi; Kitakoga, Hidetoshi; and Tayama, Hiromitsu, 4,089,178, Cl. 61-1.00F.

Kitamoto, Tatsuji: *See—*
Shirahata, Ryuji; Suzuki, Masaaki; Yamada, Yasuyuki; Kitamoto, Tatsuji; and Dezawa, Shin-ichiro, 4,089,993, Cl. 427-129.000.

Kittrell, James R.; and Herman, Donald L., to New England Power Service Company; and Northern Utilities Service Company. Process for the catalytic reduction of nitric oxide. 4,089,930, Cl. 423-239.000.

Kiviranna, John, to Forbro Design Corp. Regulated power supply crow-bar protection. 4,090,123, Cl. 323-8.000.

Klaui, Heinrich, to Hoffmann-La Roche Inc. Stable solutions of ipronidazole. 4,089,968, Cl. 424-273.00R.

Kleespies, Richard M.; and Parke, Fred F. Kit to convert fixed live axle on motor vehicle to lock-in, lock-out power hub. 4,089,610, Cl. 403-1.000.

Klein, Wilfried: *See—*
Berger, Horst H.; Heuber, Klaus; Klein, Wilfried; Najmann, Knut; and Wiedmann, Siegfried, 4,090,255, Cl. 365-154.000.

Kleinert, Dieter: *See—*
Fuhrer, Egon; Kleinert, Dieter; and Haring, Reinhard, 4,090,161, Cl. 335-281.000.

Kleinschmidt, Heinz: *See—*
Flaschar, Heinz; Kleinschmidt, Heinz; Kroll, Peter; and Fischer, Gunter, 4,089,344, Cl. 137-491.000.

Klingler, Thomas C.; Schmidt, Donald L.; Jensen, Warner, Jr.; and Urchick, Demetrius, to Dow Chemical Company, The. Process for producing hydroxyarylpolymethylenesulfonium salts. 4,089,877, Cl. 260-332.30R.

Kluge, Arthur F.: *See—*
Muchowski, Joseph M.; and Kluge, Arthur F., 4,089,969, Cl. 424-274.000.

Klyce, Battle Hargrove; Sansone, Frank Peter; and Ziegler, Roger Mark, to Bell Telephone Laboratories, Incorporated. Digital time interval sensor using a free running counter and a cycle counter with only the latter being reset at each event. 4,090,133, Cl. 324-186.000.

Knauseder, Franz; and Wagner, Helmut, to Biochemie. Pleuromutilin solvates. 4,089,891, Cl. 560-188.000.

Knets, Ivar Valterovich: *See—*
Kalnberz, Viktor Konstantinovich; Yanson, Kharald Arnoldovich; Knets, Ivar Valterovich; and Saulgozis, Jury Zhanovich, 4,089,071, Cl. 3-1.900.

Knieser, James J., to Xerox Corporation. Liquid developer cleaning means. 4,089,683, Cl. 96-1.0LY.

Knight, Alan Clifford, to International Standard Electric Corporation. Phase-controlled track circuit receiver. 4,089,495, Cl. 246-34.00R.

Knight, Jack B., to Philip Morris Incorporated. Method for control of air relative humidity with reduced energy usage. 4,089,666, Cl. 62-91.000.

Knipp, Ulrich: *See—*
Raffel, Reiner; Althausen, Ferdinand; Knipp, Ulrich; Krippl, Kurt; Fohr, Wolfgang; and Schwesig, Helmut, 4,089,206, Cl. 73-19.000.

Knoll, Jozsef: *See—*
Meszaros, Zoltan; Knoll, Jozsef; Hermecz, Istvan; Simon, Piroska; Szentmiklosy, Peter; Vasvari, Lelle; Horvath, Agnes; Horvath, Gabor; and Dvortsak, Peter, 4,089,858, Cl. 260-295.00R.

Knudson, Charles B., to Microdot Inc. Resilient seal rings with dual lips. 4,089,533, Cl. 277-152.000.

Kobayashi, Akira: *See—*
Sano, Takezo; Kobayashi, Akira; and Murase, Ichiki, 4,089,816, Cl. 260-2.20R.

Kobayashi, Masao: *See—*
Ichikawa, Hiroki; and Kobayashi, Masao, 4,089,487, Cl. 242-186.000.

Kobayashi, Miyuki: *See—*
Furuya, Tsutomu; Ayabe, Shinichi; Kobayashi, Miyuki; and Tanimoto, Tadao, 4,089,606, Cl. 536-4.000.

Koehring Company: *See—*
Briggs, Eugene C.; Chakrawarti, Shekhar; Wellbaum, William C.; and Shaftner, Robert F., 4,089,642, Cl. 432-222.000.

Koeller, Paul, to Dominion Engineering Works Limited. Distributor for turbo hydraulic machines. 4,089,617, Cl. 415-163.000.

Koenig, Shulamith S., to Incontrol Industries Ltd. Pulsating shower heads. 4,089,471, Cl. 239-381.000.

Koert, James M.; and Wiley, Paul F., to Upjohn Company, The. Antibiotics steffimycinol and 7-deoxysteffimycinol and process for preparing the same. 4,089,872, Cl. 260-365.000.

Koester, Richard H., to Singer Company, The. Manual film retrieval. 4,089,450, Cl. 226-127.000.

Kogure, Yukitoshi: *See—*
Morita, Yazaemon; Kogure, Yukitoshi; and Nomura, Akira, 4,089,932, Cl. 423-338.000.

Kohama, Tokio: *See—*
Egami, Tsuneyuki; Kawai, Hisasi; Kohama, Tokio; and Obayashi, Hideki, 4,089,214, Cl. 73-116.000.

Kohanek, Dennis George: *See—*
Barry, Richard Francis; Gourley, Charles Angus; and Kohanek, Dennis George, 4,089,104, Cl. 29-626.000.

Kohlen, Rudolf: *See—*
Baron, Gerhard; Rudolph, Paul; Kohlen, Rudolf; and Hafke, Carl, 4,089,659, Cl. 48-197.00R.

Kohorn, Alfred O. Knitting machine needles with improved cut-off and spring location. 4,089,192, Cl. 66-123.000.

Koike, Shyouichi, to Nissan Motor Company, Limited. Window guide mechanism for a tight air seal of a vehicle window assembly. 4,089,134, Cl. 49-227.000.

Kojima, Kenichi: *See—*
Shinohara, Toshio; Arai, Masatoshi; and Kojima, Kenichi, 4,089,884, Cl. 260-448.20N.

Kokusai Denshin Denwa Kabushiki Kaisha: *See—*
Nakagome, Yukio; Teramura, Hiroichi; Yamazaki, Yasuhiro; and Wakahara, Yasushi, 4,090,222, Cl. 358-280.000.

Kollar, Ernest Paul: *See—*
Colglazier, Donald Francis; Fallon, John Leslie; Kollar, Ernest Paul; and Mares, Fred Ralph, 4,089,516, Cl. 271-9.000.

Komamiya, Yasuo: *See—*
Tateno, Hiroshi; Kataoka, Shoei; Hashizume, Nobuo; and Komamiya, Yasuo, 4,090,155, Cl. 333-80.00T.

Komatsu, Fumiaki: *See—*
Matsuno, Yoshiyuki; Nohara, Tomiyasu; Komatsu, Fumiaki; and Imanishi, Nobuyuji, 4,089,284, Cl. 114-26.000.

Konczalski, Ronald L., to Michigan Oven Company. Thermal regeneration and decontamination apparatus and industrial oven. 4,089,088, Cl. 23-277.00C.

Kondo, Katsuya; and Yamakawa, Tomio, to Sumitomo Metal Industries, Ltd. Method of controlling inter-stand tension in rolling mills. 4,089,196, Cl. 72-12.000.

Kondo, Toshihiro, to Fuji Photo Film Co., Ltd.; and Kondo, Toshihiro. Automatic image focusing system for cameras. 4,090,209, Cl. 354-25.000.

Konig, Klaus; and Dietrich, Manfred, to Bayer Aktiengesellschaft. Stable polyurethane dispersions and process for production thereof. 4,089,835, Cl. 260-31.600.

Konishiroku Photo Industry Co., Ltd.: *See—*
Morita, Shizuo; and Kimura, Kiyoshi, 4,089,297, Cl. 118-647.000.

Koniz, Leon F.; and Estes, John H., to Texaco Inc. Preparation of catalyst support. 4,089,811, Cl. 252-463.000.

Konuma, Hideo: *See—*
Tokumitsu, Ichiro; Konuma, Hideo; Mochizuki, Shigeaki; Morotomi, Kohichi; Murai, Norio; and Koyama, Mikio, 4,089,888, Cl. 260-463.000.

Koo, Ronald C., to Duro-Test Corporation. High intensity discharge lamp with multiple filament to extinguish lamp when outer envelope breaks. 4,090,105, Cl. 315-74.000.

Kooker, Stephen L. Musical rhythm-tempo tutoring device. 4,089,246, Cl. 84-470.00R.

Kooya, Kazuo: *See—*
Takamizawa, Minoru; Umemura, Mitsuo; and Kooya, Kazuo, 4,089,882, Cl. 260-448.20E.

Koppers, Manfred, to Thyssen Industrie AG. Canopy and shield structure for supporting a shield in a seam-like mine deposit. 4,089,181, Cl. 61-45.00D.

Koppy Corporation: *See—*
Good, William K.; and Harbage, Wilson J., 4,089,097, Cl. 29-163.50R.

Kopytov, Alexandr Maximovich: *See—*
Polsky, Jury Mikhailovich; Zakharov, Valentin Petrovich; Golets, Nikolai Trofimovich; Tayakin, Jury Vasilievich; Lipovetsky, Gennady Petrovich; Protsenko, Valery Vasilievich; Khomenko, Alexandr Dmitrievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich, 4,090,246, Cl. 364-736.000.

Kornis, Gabriel; Nidy, Eldon G.; Vostral, Henry J.; and Steinhards, Arnolds, deceased (by Killinger, John J., administrator), to Upjohn Company, The. 1-(Substituted-hydrocarbyl)-di- and trihalopyrazoles. 4,089,672, Cl. 71-92.000.

Korody, Ronald Sherwin John: *See—*
Blaiklock, William Musgrave; and Korody, Ronald Sherwin John, 4,090,094, Cl. 307-132.00M.

Korson, Brian. Inflatable container. 4,089,358, Cl. 150-.500.

Kosuge, Shuichi, to Nippondenso Co., Ltd. Indication apparatus. 4,090,194, Cl. 340-414.000.

Kotera, Hiroaki; Hayami, Heijiro; Tsuchiya, Hiroyoshi; Kan, Ryuzo; Yoshida, Kunio; Shibata, Tsutomu; and Tsuda, Yukifumi, to Matsushita Electric Industrial Company, Limited. Color separating method and apparatus using statistical techniques. 4,090,243, Cl. 364-526.000.

Koumura, Masahiko: *See—*
Tamada, Kazumi; Mizuno, Sueo; Takase, Tadayoshi; Koumura, Masahiko; and Soma, Shinichi, 4,089,319, Cl. 126-21.00A.

Kouvoussis, Anthony E.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,090,236, Cl. 364-200.

Koyama, Mikio: *See—*
Tokumitsu, Ichiro; Konuma, Hideo; Mochizuki, Shigeaki; Morotomi, Kohichi; Murai, Norio; and Koyama, Mikio, 4,089,888, Cl. 260-463.000.

Koyanagi, Shunichi; Hasegawa, Niichiro; Shimizu, Toshihide; Kaneko, Ichiro; and Katsushima, Sensaku, to Shin-Etsu Chemical Co., Ltd. Method for polymerizing dienic monomers. 4,090,015, Cl. 526-62.000.

Kozischek, James F., to Armour Pharmaceutical Company. Production of macrospherical particles for anti-perspirants and the like. 4,089,120, Cl. 34-12.000.

Kramb, Hans, to Bayer Aktiengesellschaft. Sulfo containing disazo dyestuffs derived from diazotized 4,4'-diaminobenzanilide, a 1-phenyl-3-methyl-5-aminopyrazole coupler and a second coupler. 4,089,851, Cl. 260-160.000.

Kranert, Klaus; and Wilke, Konrad, to Licentia Patent Verwaltungs-G.m.b.H. Method and apparatus for the automatic positioning of a ship to minimize the influence of external disturbance forces. 4,089,287, Cl. 114-144.00B.

Kranzler, Ernst; and Kuhlmann, Gerhard, to Robert Bosch GmbH. Arrangement for electrically connecting wire coils of an electric machine to an electric circuit. 4,090,098, Cl. 310-71.000.

Kraska, Irvin R.; Mathieson, Thomas A.; Johnson, Richard N.; Lichodziejewski, Wieslaw L.; Gamache, David Leo; and Ash, Leon, to Gard, Inc.; and United States of America, Army. System for residual tire life prediction by ultrasound. 4,089,225, Cl. 73-614.000.

Kraska, Irvin R.; Stark, John; and Lichodziejewski, Wieslaw L., to Gard, Inc. System for residual tire life prediction by ultrasound. 4,089,226, Cl. 73-614.000.

Krause, Gerhard, to Siemens Aktiengesellschaft. Integrated degenerative amplifier. 4,090,149, Cl. 330-293.000.

Krause Milling Company: *See*—
Cummisford, Robert G.; Wasielewski, Richard J.; and Krueger, Robert K., 4,089,691, Cl. 106-38.400.

Kreinik, Stephen, to Thomson-CSF Laboratories, Inc. Television titling system for producing overlapping characters. 4,090,187, Cl. 340-324.0AD.

Krippl, Kurt: *See*—
Raffel, Reiner; Althausen, Ferdinand; Knipp, Ulrich; Krippl, Kurt; Fohr, Wolfgang; and Schwesig, Helmut, 4,089,206, Cl. 73-19.000.

Kroll, Peter: *See*—
Flaschar, Heinz; Kleinschmidt, Heinz; Kroll, Peter; and Fischer, Gunter, 4,089,344, Cl. 137-491.000.

Kroner, Klaus; and Zwijsen, Wilhelmus Antonius Joseph Marie, to U.S. Philips Corporation. Circuit arrangement for switching a tuning voltage with low switch offset voltages and temperature compensation. 4,090,124, Cl. 323-19.000.

Kronner, Richard F., to Harris, James H. Uterine catheter and manipulator with inflatable seal. 4,089,337, Cl. 128-348.000.

Krueger, Robert K.: *See*—
Cummisford, Robert G.; Wasielewski, Richard J.; and Krueger, Robert K., 4,089,691, Cl. 106-38.400.

Krumbein, Fritz, to Robert Bosch GmbH. Sound motion-picture camera. 4,089,596, Cl. 352-27.000.

Krumpelt, Michael; and Hirozawa, Stanley Tariho, to BASF Wyandotte Corporation. Method for improving selectivity of membranes used in chlor-alkali cells. 4,089,759, Cl. 204-98.000.

Kuboshima, Makoto, to Fuji Photo Film Co., Ltd. Device for correcting distortion of a projected image. 4,089,599, Cl. 353-70.000.

Kucheck, Leo: *See*—
Crankshaw, Michael; Kucheck, Leo; and Caudill, Donald L., 4,089,725, Cl. 156-299.000.

Kucsma, Michael E.: *See*—
Hornbaker, Edwin D.; Jones, Jesse D.; Kucsma, Michael E.; and Allen, Thomas S., 4,089,838, Cl. 260-40.00R.

Kuehl, Donald Roy: *See*—
Meyers, George Leroy; and Kuehl, Donald Roy, 4,089,458, Cl. 229-32.000.

Kugelfischer Georg Schafer & Co.: *See*—
Markfelder, Gunter; Hofmann, Heinrich; and Scharting, Gunter, 4,089,570, Cl. 308-194.000.
Schmidt, Wolfgang, 4,089,566, Cl. 308-3.00R.

Kuhlmann, Gerhard: *See*—
Kranzler, Ernst; and Kuhlmann, Gerhard, 4,090,098, Cl. 310-71.000.

Kukino, Yoshinori: *See*—
Endo, Masaaki; Miura, Mitsuo; and Kukino, Yoshinori, 4,089,183, Cl. 61-50.000.

Kulbida, Ihor: *See*—
Johnson, Richard Calvin; and Kulbida, Ihor, 4,090,108, Cl. 315-158.000.

Kulig, Stanislaw; Goral, Andrzej; Surkow, Wlodzimierz; Szczepanik, Andrzej; and Szulaczewski, Edward, to Cebea Osrodek Badawczo-Rozwojowy Przemyslu Budowy Urzadzen Chemicznych. Pulsation and noise suppressor assembly with air filter. 4,089,663, Cl. 55-276.000.

Kumai, Seisaku: *See*—
Yamabe, Masaaki; Munekata, Seiji; Kumai, Seisaku; and Samejima, Shunichi, 4,089,869, Cl. 260-343.500.

Kumiai Chemical Industry Co., Ltd.: *See*—
Shinohara, Toshio; Arai, Masatoshi; and Kojima, Kenichi, 4,089,884, Cl. 260-448.20N.
Sugiyama, Hironari; Chiyomaru, Isao; Okuda, Itsuki; Yamamoto, Hisaaki; and Ito, Hideo, 4,089,964, Cl. 424-270.000.

Kurihara, Tomomichi: *See*—
Okamoto, Tomiyasu; Nishimoto, Tsunanori; Sawada, Kaoru; Hayakawa, Koji; and Kurihara, Tomomichi, 4,089,285, Cl. 114-74.00A.

Kurosawa, Masao: *See*—
Akoh, Shigeichi; Harada, Hiroo; Ueda, Yutaka; and Kurosawa, Masao, 4,089,255, Cl. 93-36.010.

Kuroyama, Toshinobu; and Hirose, Hisashi, to Toyota Jidosha Kogyo K.K. Digital clock for motor vehicles. 4,089,157, Cl. 58-50.00R.

Kyburz, Emilio, to Hoffmann-La Roche, Inc. (+)-(S)-Enantiomer of 3-{2-[4-(8-fluoro-10,11-dihydro-2-methyl-dibenzo[b,f]thiepin-10-yl)-1-piperazinyl]-ethyl}-2-oxazolidinone. 4,089,861, Cl. 544-369.000.

Label-Aire Inc.: *See*—
Crankshaw, Michael; Kucheck, Leo; and Caudill, Donald L., 4,089,725, Cl. 156-299.000.

Laboy, Amaury Antonio. Mechanical shoppers guide. 4,089,292, Cl. 116-133.000.

Ladenberger, Volker: *See*—
Bronstert, Klaus; Ladenberger, Volker; Druschke, Wolfgang; Groh, Wolfgang; and Mueller, Helmut, 4,089,824, Cl. 260-27.0BB.

Lafferty, John Joseph: *See*—
Kaiser, Carl; and Lafferty, John Joseph, 4,089,961, Cl. 424-267.000.

LaFrance Precision Casting Company: *See*—
Teti, Joseph A., Jr.; and Peroni, Peter A., 4,089,464, Cl. 220-4.00A.

Lagasse, Eugene F., to Conrac Corporation. Antenna mount and connector. 4,090,030, Cl. 174-153.00A.

La Grouw, Coenraad Maria; and Marius, Plaeger, to U.S. Philips Corporation. Glass for television display cathode-ray tubes. 4,089,693, Cl. 106-52.000.

Lai, I-Chen. Manacles. 4,089,195, Cl. 70-16.000.

Laib, Jakob C. Ampule. 4,089,415, Cl. 206-484.200.

Laird, Andrew K.: *See*—
Poticha, Charles; and Laird, Andrew K., 4,090,126, Cl. 324-57.0SS.

Lakra, Paul, to Lucas Industries Limited. Fuel injection systems. 4,089,315, Cl. 123-139.0AK.

Lamke, Arland D.: *See*—
Gilker, Clyde; and Lamke, Arland D., 4,090,225, Cl. 361-3.000.

Landoni, Giannino, to Meca S.n.c. Control device of a needle-bearing in a quilting machine. 4,089,281, Cl. 112-221.000.

Landt, Richard C.: *See*—
Dahl, Warren F.; and Landt, Richard C., 4,089,247, Cl. 85-70.000.

Landy, Jerome J. Glove port and insert. 4,089,571, Cl. 312-1.000.

Lang, Boris M. Writing and kinesthetic teaching device. 4,089,126, Cl. 35-36.000.

Lang, Thomas G., to United States of America, Navy. Ocean adapted airship. 4,089,492, Cl. 244-30.000.

Lang, Walter W.; and Maier, Alfred E., to Westinghouse Electric Corp. Circuit breaker with improved trip means. 4,090,159, Cl. 335-173.000.

Lange, Roger W.; and Sowman, Harold G., to Minnesota Mining and Manufacturing Company. Ultraviolet absorbing coatings. 4,089,996, Cl. 427-160.000.

Lantzsch, Reinhard; Uhrhan, Paul; Oertel, Harald; Roos, Ernst; and Arlt, Dieter, to Bayer AG. Thiazolinylamino-piperidine derivatives. 4,089,841, Cl. 260-45.8SN.

Lanzilotti, Anthony Edward, to American Cyanamid Company. Process for the preparation of cis-5,6-dimethoxy-2-meethyl-3-[2-(4-phenyl-1-piperazinyl)-ethyl]indoline. 4,089,853, Cl. 544-373.000.

La Pietra, Jack, to Mulvihill, James W.; and Amine, Youssef, part interest to each. Method of converting single pane glass to multiple pane, hermetically sealed insulating glass without removing the existing glass sash and frame. 4,089,143, Cl. 52-172.000.

Lapinski, Richard; and Matusjewski, Marian Richard, to Catuma Pty. Ltd. Weather excluder. 4,089,136, Cl. 49-308.000.

Largman, Theodore: *See*—
Mares, Frank; and Largman, Theodore, 4,089,649, Cl. 8-115.500.

Larkin, John M.: *See*—
Duranleau, Roger G.; Larkin, John M.; and Newman, Stanley R., 4,089,867, Cl. 260-307.00G.

Larkin, Wallace Keith, to Kayce, Inc. Acoustical communications headset. 4,090,042, Cl. 179-156.00A.

Larrucea, Henry. Wheel carriage assembly. 4,089,536, Cl. 280-11.280.

Larsson, Karl Georg: *See*—
Ericsson, Sylve Jack Donald; and Larsson, Karl Georg, 4,089,123, Cl. 34-155.000.

Lasater, Neil J.: *See*—
Cisney, Merle E.; and Lasater, Neil J., 4,089,904, Cl. 260-607.0AR.

Lasiewicz, Thaddeus W.; Wrabl, Otto; and Oddo, Donald J., to Fox Valley Corporation. Tube coating apparatus. 4,089,294, Cl. 118-230.000.

Lathouwers, Theodorus Wilhelmus: *See*—
de Zwart, Maarten; and Lathouwers, Theodorus Wilhelmus, 4,089,588, Cl. 350-350.000.

Laudahn, Gerhard: *See*—
Itil, Turan M.; Laudahn, Gerhard; and Herrmann, Werner Martin, 4,089,952, Cl. 424-243.000.

Lauzanne-Morelle, Eliane M.-T: *See*—
Morelle, Jean V.; and Lauzanne-Morelle, Eliane M.-T, 4,089,954, Cl. 424-245.000.

Lawrence Peska Associates, Inc.: *See*—
Miller, Joe, 4,090,183, Cl. 340-280.000.

Lawson, Nelson E., to Union Camp Corporation. Polyacrylate reaction products. 4,089,825, Cl. 260-27.00R.

Leblanc, Michel, to Agence Nationale de Valorisation de la Recherche (Anvar). Device for measuring the time interval separating the leading edges of two correlated pulses which have independent amplitudes and rise times. 4,090,141, Cl. 328-129.000.

Lechaton, John S.: *See*—
Havas, Janos; Lechaton, John S.; and Logan, Skinner, 4,090,006, Cl. 428-81.000.

Lee, Edward. Handle support and operating assembly for aerosol spray cans. 4,089,440, Cl. 222-174.000.

Leenhouts, Albert C., to Superior Electric Company, The. Method and means for controlling energization by commands. 4,090,120, Cl. 318-567.000.

Lefeber, Jan; and de Jonge, Jelis, to U.S. Philips Corporation. Method of manufacturing a variable capacitor. 4,089,093, Cl. 29-25.420.

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Mondt, Josef; Rauterkus, Karl Josef; Lehmann, Heinz; Stelzel, Werner; and Vitzthum, Hans, 4,089,999, Cl. 427-385.00R.

Leiter, Robert, to Webasto-Werk W. Baier KG. Upwardly pivotable vent or sliding roof panel for automobiles. 4,089,557, Cl. 296-137.00F.

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Lemke, Charles H., to Du Pont de Nemours, E. I., and Company. Electrolytic cell. 4,089,770, Cl. 204-247.000.

Lerma, Jesse P.; and Lindquist, Charles A., to Odetics, Inc. Method and means for evaluating phase encoded communication systems. 4,090,242, Cl. 364-514.000.

Lerner, Moisey M.; and Morse, James H., to Sanford Process Corporation. Hard anodizing process. 4,089,756, Cl. 204-58.000.
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Les Cables de Lyon S.A.: *See—*
Dubost, Rene; and Grenat, Bernard, 4,089,154, Cl. 57-3.000.
Levek, Robert P.; and Williams, David O., to Great Lakes Chemical Corporation. Stabilized flame-retardant styrenic polymer compositions and the stabilizing flame-retardant mixtures used therein. 4,089,912, Cl. 260-862.000.
Lewicki, Walter J., Jr., to Armstrong Cork Company. Apparatus for multilevel embossing of sheet materials. 4,089,731, Cl. 156-555.000.
Lewis, Michael William James: *See—*
White, William Paul; and Lewis, Michael William James, 4,089,265, Cl. 101-375.000.
Lewis, Peter J.: *See—*
Miserlis, Constantine D.; and Lewis, Peter J., 4,089,365, Cl. 165-1.000.
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Anderle, Fritz; Frey, Gerhard; Grein, Lutz; Reimpell, Uwe; and Stark, Friedrich, 4,089,505, Cl. 251-133.000.
Leypold, Dieter; Vachenauer, Erwin; and v. Pieverling, Klaus, to Siemens Aktiengesellschaft. Method for the comparative vector measurement of signal pulses arriving nearly simultaneously at several radio receiving stations. 4,090,200, Cl. 343-106.00R.
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Maserjian, Joseph; Chern, Shy Shiun; and Li, Seung P., 4,090,213, Cl. 357-30.000.
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Kranert, Klaus; and Wilke, Konrad, 4,089,287, Cl. 114-144.00B.
Lichodziejewski, Wieslaw L.: *See—*
Kraska, Irvin R.; Mathieson, Thomas A.; Johnson, Richard N.; Lichodziejewski, Wieslaw L.; Gamache, David Leo; and Ash, Leon, 4,089,225, Cl. 73-614.000.
Kraska, Irvin R.; Stark, John; and Lichodziejewski, Wieslaw L., 4,089,226, Cl. 73-614.000.
Lien, Ming T.: *See—*
Burtis, Eric F.; and Lien, Ming T., 4,089,124, Cl. 35-31.00C.
Light, Kenneth K.; Vock, Manfred Hugo; Shuster, Edward J.; and Schmitt, Frederick Louis, to International Flavors & Fragrances Inc. Flavoring with norbornanol derivatives. 4,089,986, Cl. 426-538.000.
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Lillwitz, Larry D., to Quaker Oats Company, The. Manufacture of furfuryl alcohol. 4,089,871, Cl. 260-347.800.
Lilly, Colin Garry: *See—*
Fisher, Maurice; Maber, Terence Walter; and Lilly, Colin Garry, 4,089,736, Cl. 156-665.000.
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Harrison, Roger Garrick; Jamieson, William Boffey; Ross, William James; and Saunders, John Christopher, 4,089,962, Cl. 424-269.000.
Limburg, William W.: *See—*
Saeva, Franklin D.; Olin, George R.; and Limburg, William W., 4,089,684, Cl. 96-1.100.
Lincklaen-Arriens, Jan; van Tilburg, Alfred; and van Waart, Teunis L., to Shell Oil Company. Process and apparatus for investigating the activity of a cathodic protection unit. 4,090,170, Cl. 340-5.00R.
Lindner, Heinz, to VEB Wirkmaschinenbau Karl-Marx-Stadt. Patterning apparatus for knitting machines, particularly for manufacturing patterned knitted pile fabrics on crochetting machines. 4,089,191, Cl. 66-84.00R.
Lindquist, Charles A.: *See—*
Lerma, Jesse P.; and Lindquist, Charles A., 4,090,242, Cl. 364-514.000.
Lindsay, Harry Lee: *See—*
Angier, Robert Bruce; and Lindsay, Harry Lee, 4,089,965, Cl. 424-270.000.
Lineback, Lynn David: *See—*
Doolittle, Stephen Dale; Lineback, Lynn David; Sherrill, Charles Franklin; Stanfield, Willie Lonnie, Jr.; and Wildman, Kelvin Howard, 4,089,114, Cl. 30-276.000.
Link, Christoph: *See—*
Hildebrand, Otto; Link, Christoph; Reutter, Siegfried; and Stotz, Wolf-Gunter, 4,089,739, Cl. 162-343.000.
Lion Dentifrice Co., Ltd., The: *See—*
Higo, Moriaki; Saga, Hitoshi; Watanabe, Yoji; and Suzuki, Kunitomo, 4,089,764, Cl. 204-162.00R.
Lipets, Adolf Usherovich; Moskvichev, Viktor Fedorovich; Katyshev, Georgy Viktorovich; Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Shamarokova, Raisa Nikiforovna; Dolgy, Alexei Arsentievich; Eletsky, Stanislav Alexandrovich; Grinberg, Yakov Natanovich; Ardamatsky, Vitaly Andreevich; Vivsik, Svyatoslav Nikolaevich; Zavedeev, Vasily Evdokimovich; Zevin, Ilya Julievich; and Fadeev, Evgeny Alexeevich. Modular heat exchanger and method of its operation. 4,089,369, Cl. 165-158.000.
Lipovetsky, Gennady Petrovich: *See—*
Polsky, Jury Mikhailovich; Zakharov, Valentin Petrovich; Golets, Nikolai Trofimovich; Tayakin, Jury Vasilievich; Lipovetsky, Gennady Petrovich; Protsenko, Valery Vasilievich; Khomenko, Alexandr Dmitrievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich, 4,090,246, Cl. 364-736.000.
Lippitt, David L., to General Electric Company. Closed loop digital control system and method for motor control. 4,090,116, Cl. 318-345.00E.
Lisfeld, Robert; Nickel, Werner; and Reinheimer, Guenter, to Ernst Leitz Wetzlar GmbH. Semi-automatic coarse-fine focusing apparatus for microscopes. 4,090,069, Cl. 250-201.000.
Litherland, James Albert Frazier, to Polypac B.A.L. Limited. Packing assemblies. 4,089,534, Cl. 277-188.00A.
Litton Systems, Inc.: *See—*
Barry, Richard Francis; Gourley, Charles Angus; and Kohanek, Dennis George, 4,089,104, Cl. 29-626.000.
Schwindt, Gary William, 4,089,581, Cl. 339-176.0MP.
Llach, Lawrence; and Picas, Arturo, to Canton Textile Mills. Variable speed drive system for carding machine. 4,089,232, Cl. 74-230.17F.
Lockwood, Herbert C.; and Robelotto, Salvatore M., to Electron Beam Welding, Inc. Optical viewing system for an electron beam welder. 4,090,056, Cl. 219-121.0EB.
Loegering, George A.; and Keller, Louis J. Removable track structure for wheeled vehicles. 4,089,565, Cl. 305-45.000.
Loersch, Joseph F.: *See—*
Toppen, Harvey R.; Loersch, Joseph F.; Paulonis, Daniel F.; and Lowrey, O. Preston, Jr., 4,089,456, Cl. 228-195.000.
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Gauer, Peter, 4,089,476, Cl. 241-70.000.
Logan, James H., II; and Logan, Richard J., Jr. Portable water supply and disbursing unit. 4,089,446, Cl. 222-609.000.
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Logan, James H., II; and Logan, Richard J., Jr., 4,089,446, Cl. 222-609.000.
Logan, Skinner: *See—*
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Logansport Distributor Inc.: *See—*
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Logerot, Bernard Andre: *See—*
Pechard, Lucien Leon; and Logerot, Bernard Andre, 4,089,577, Cl. 339-18.00P.
LoMaglio, Lewis C.: *See—*
Hafele, Robert X.; and LoMaglio, Lewis C., 4,089,442, Cl. 222-321.000.
Lomax, Donald P.; and Boggs, Ronald M. Lining alloy for bimetallic cylinders. 4,089,466, Cl. 220-454.000.
Long, Charles N., to A-T-O, Inc. Capping machine. 4,089,153, Cl. 53-331.500.
Long, Daniel Rose: *See—*
Chutter, Raymond Allen; Green, Paul James; Hofmann, Robert Lee; and Long, Daniel Rose, 4,089,437, Cl. 222-94.000.
Loomis, Phillip Eugene; Hammond, James Woodrow; and Shughart, Mervin Leonard, to AMP Incorporated. Lead making machine having improved feeding means. 4,089,405, Cl. 198-475.000.
L'Oreal: *See—*
Bore, Pierre; Arnaud, Jean-Claude; and de Labbey, Arnaud, 4,089,942, Cl. 424-47.000.
Louviot, Jean Francois, to Regie Nationale des Usines Renault. Device for accelerating the initial stroke of hydraulic jacks. 4,089,251, Cl. 91-26.000.
Lowe, Warren, to Chevron Research Company. Synergistic antioxidant additive composition. 4,089,792, Cl. 252-32.70E.
Lowrey, O. Preston, Jr.: *See—*
Toppen, Harvey R.; Loersch, Joseph F.; Paulonis, Daniel F.; and Lowrey, O. Preston, Jr., 4,089,456, Cl. 228-195.000.
Lubrizol Corporation, The: *See—*
Meinhardt, Norman Anthony, 4,089,793, Cl. 252-32.70E.
Lucas Industries Limited: *See—*
Lakra, Paul, 4,089,315, Cl. 123-139.0AK.
Lucke, Florian, to Croon & Lucke Maschinenfabrik GmbH & Co. KG. Package winding machine. 4,089,479, Cl. 242-2.000.
Lugay, Joaquin Castro; Haas, Gerhard Julius; and Beale, Robert James, to General Foods Corporation. Pet food acceptability enhancer. 4,089,978, Cl. 426-32.000.
Lukehart, Charles M., to Vanderbilt University. Complexes of metallated coordination ligands. 4,089,881, Cl. 260-429.00R.
Lum, Vincent Y.: *See—*
Chen, Tien Chi; Tung, Chin; and Lum, Vincent Y., 4,090,249, Cl. 364-900.000.
Lundeberg, Russell Edgar, to General Signal Corporation. Liquid tight connector with improved ground conductivity. 4,090,029, Cl. 174-51.000.
Lupatin, Elio, to Societa Italiana Telecomunicazioni Siemens S.p.A. Protective device for a system feeding a balanced load from a remote power supply. 4,090,228, Cl. 361-86.000.
Luttinger, Manfred; Cremeans, George E.; and Nowacki, Louis J., to Manley Bros. of Indiana, Inc.; and Borden, Inc., a part interest to each. Shell molding process and composition. 4,089,837, Cl. 260-38.000.
Luzzi, John J.: *See—*
Ramey, Chester E.; and Luzzi, John J., 4,089,842, Cl. 260-45.75C.
Lybarger, James H.; Templeton, Charles C.; Richardson, Edwin A.; and Scheuerman, Ronald F., to Shell Oil Company. Increasing the clay-dissolving capability of a relatively high pH self-generating mud acid. 4,089,787, Cl. 252-8.55C.
Lyon, Richard H.: *See—*
Huffman, Harold W.; Lyon, Richard H.; Holmes, David G.; and Donahue, John W., 4,090,205, Cl. 346-75.000.
Lyons, John E., to Eutectic Corporation. Multiple-coordinate means

for applying a metal coating to a metal substrate. 4,089,293, Cl. 118-7.000.
M. A. Buckley (Engraving) Limited: *See*—
White, William Paul; and Lewis, Michael William James, 4,089,265, Cl. 101-375.000.
Ma, Shih-Yu: *See*—
Strunk, Richard John; Hubbard, Winchester Loomis; and Ma, Shih-Yu, 4,089,972, Cl. 424-288.000.
Maber, Terence Walter: *See*—
Fisher, Maurice; Maber, Terence Walter; and Lilly, Colin Garry, 4,089,736, Cl. 156-665.000.
Macaluso, Anthony, Sr.: *See*—
Rigdon, Orville W.; and Macaluso, Anthony, Sr., 4,089,689, Cl. 106-14.280.
Macaulay, Malcolm Jack; and Simroth L., Ernesto. High capacity separator for semolina. 4,089,777, Cl. 209-259.000.
Machenschalk, Rudolf; and Bildstein, Hubert, to Schwarzkopf Development Corporation. X-ray target. 4,090,103, Cl. 313-330.000.
Mack, Raymond F. Holding clamp means for locking pliers. 4,089,513, Cl. 269-96.000.
Madison-Kipp Corporation: *See*—
Thomson, Ronald E.; and Schmitt, James F., 4,089,295, Cl. 118-316.000.
Maekawa, Koji: *See*—
Hamasaki, Iwao; and Maekawa, Koji, 4,090,245, Cl. 364-712.000.
Magdo, Ingrid E.: *See*—
Joy, Richard C.; Magdo, Ingrid E.; and Phillips, Alfred, Jr., 4,089,712, Cl. 148-175.000.
Mages, Bernhard: *See*—
Rock, Erich; and Mages, Bernhard, 4,089,567, Cl. 308-3.600.
Magester, Earl H.: *See*—
Schumacher, Frank A.; and Magester, Earl H., 4,089,187, Cl. 62-289.000.
Magnien, Christian; and Secher, Fernand, to Societe Lannionnaise d'Electronique Sle-Citerel S.A. Method and apparatus for coding a signal. 4,090,136, Cl. 325-38.00B.
Mahlein, Hans; and Winzer, Gerhard, to Siemens Aktiengesellschaft. Narrow band reflection polarizer. 4,089,582, Cl. 350-96.130.
Mahn, Gunther Hans, to W. H. Brady Co. Aisle marker applicating machine. 4,089,730, Cl. 156-541.000.
Maier, Alfred E.: *See*—
Lang, Walter W.; and Maier, Alfred E., 4,090,159, Cl. 335-173.000.
Maijala, William R. Snow removal apparatus. 4,089,127, Cl. 37-53.000.
Makowicki, James M., to Curtiscorp, Inc. Polystyrene container with polypropylene hinge and latch. 4,089,467, Cl. 220-334.000.
Malek, Elmer M.: *See*—
DeVries, William S., Jr.; and Malek, Elmer M., 4,089,145, Cl. 52-461.000.
Malhoit, Edward C.: *See*—
Bernard, Stanley E.; Flouris, Soto F.; and Malhoit, Edward C., 4,089,593, Cl. 350-236.000.
Malz Nominees Pty. Ltd.: *See*—
Trihey, John Massey, 4,089,323, Cl. 126-270.000.
Manaka, Nobuzi: *See*—
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Manley Bros. of Indiana, Inc.: *See*—
Luttinger, Manfred; Cremeans, George E.; and Nowacki, Louis J., 4,089,837, Cl. 260-38.000.
Mann, Max E. Process for making cast articles having a fractured surface. 4,089,924, Cl. 264-157.000.
Mannesmannrohren-Werke AG.: *See*—
Gust, Karl; Hankel, Albert; Hasenclever, Horst; and Titze, Eberhard, 4,089,122, Cl. 34-79.000.
Mano, Kenji: *See*—
Amano, Tadashi; Kawano, Susumu; and Mano, Kenji, 4,089,198, Cl. 72-320.000.
Mansei Kogyo Kabushiki Kaisha: *See*—
Goto, Kenjiro, 4,089,636, Cl. 431-132.000.
Marass, Josef, to Georg Spiess GmbH. Sheet feeder with correction for sheet offset. 4,089,517, Cl. 271-13.000.
Marchal, Philippe Albert Hippolyte, to Bertin & Cie. Compact heat-exchanger for fluids. 4,089,370, Cl. 165-159.000.
Marchetti, Michael John: *See*—
Czerner, Peter Alfred; and Marchetti, Michael John, 4,089,109, Cl. 30-34.100.
Marconi Company Limited, The: *See*—
Byatt, Dennis William George; and Brown, Harold Thomas, 4,090,212, Cl. 357-24.000.
Marcus, Rudolph J.: *See*—
Heller, Carl A.; Richter, Herbert P.; and Marcus, Rudolph J., 4,089,797, Cl. 252-188.3CL.
Mares, Frank; and Largman, Theodore, to Allied Chemical Corporation. Compositions and process for fiber modification. 4,089,649, Cl. 8-115.500.
Mares, Fred Ralph: *See*—
Colglazier, Donald Francis; Fallon, John Leslie; Kollar, Ernest Paul; and Mares, Fred Ralph, 4,089,516, Cl. 271-9.000.
Marforio, Nerino, to Rockwell-Rimoldi, S.p.A. Sewing machine work guide for automatically forming a seam along a curved path. 4,089,280, Cl. 112-153.000.
Marius, Plaeger: *See*—
La Grouw, Coenraad Maria; and Marius, Plaeger, 4,089,693, Cl. 106-52.000.
Markfelder, Gunter; Hofmann, Heinrich; and Scharting, Gunter, to Kugelfischer Georg Schafer & Co. Journal bearing with axially split bearing rings. 4,089,570, Cl. 308-194.000.
Marks, Edwin Morrison, to Whirlpool Corporation. Refrigerator ice door mechanism. 4,089,436, Cl. 222-70.000.
Marsh Products, Inc.: *See*—
Marsh, Richard E., 4,090,045, Cl. 200-5.00A.
Marsh, Richard E., to Marsh Products, Inc. Keyboard strip switch assembly having multifurcated conductive screen contact with contact cleaning wiping-action. 4,090,045, Cl. 200-5.00A.
Marshall, J. Howard, III; and Harrington, Timothy M., to MDH Industries Inc. Circuitry for improving linearity of a counting system. 4,090,082, Cl. 250-375.000.
Martin, Claude Raymond, to Societe d'Etude et de Construction d'Appareils de Precision (S.E.C.A.P.). Franking machine comprising an electronic counting system. 4,090,063, Cl. 235-92.0AC.
Martin, Jerome A.: *See*—
Muzyczko, Thaddeus M.; Shore, Samuel; and Martin, Jerome A., 4,089,789, Cl. 252-8.55E.
Martin Marietta Corporation: *See*—
Popkin, Philip, 4,090,035, Cl. 179-15.0BO.
Ray, James A., 4,089,695, Cl. 106-89.000.
Ray, James A., 4,089,696, Cl. 106-90.000.
Martin, Peter G., to Arthur D. Little, Inc. Portable data entry device. 4,090,247, Cl. 364-900.000.
Martinez, Vincent. Suspended ceiling. 4,089,146, Cl. 52-484.000.
Marvin Glass & Associates: *See*—
Meyer, Burton C.; Imatt, Alex; and Brand, Derek R., 4,089,598, Cl. 353-17.000.
Mas, Joseph A. Moving magnet meter having a closed magnetic circuit rotor. 4,090,131, Cl. 324-146.000.
Maschinenfabrik Hennecke GmbH: *See*—
Raffel, Reiner; Althausen, Ferdinand; Knipp, Ulrich; Krippl, Kurt; Fohr, Wolfgang; and Schwesig, Helmut, 4,089,206, Cl. 73-19.000.
Masco Corporation of Indiana: *See*—
Christo, Christ, 4,089,347, Cl. 137-625.410.
Maserjian, Joseph; Chern, Shy Shiun; and Li, Seung P., to California Institute of Technology. Induced junction solar cell and method of fabrication. 4,090,213, Cl. 357-30.000.
Mashimo, Yukio; and Ito, Tadashi, to Canon Kabushiki Kaisha. Photographic information indication device. 4,090,207, Cl. 354-23.00D.
Mason, William B., to Teccor Electronics, Inc. Power frequency converter. 4,090,235, Cl. 363-160.000.
Masri, Merle S.; Randall, Virginia G.; and Stanley, William L., to United States of America, Agriculture. Method for insolubilizing enzymes on chitosan. 4,089,746, Cl. 195-63.000.
Massachusetts Institute of Technology: *See*—
Flemings, Merton C.; Young, Kenneth P.; and Riek, Rodney G., 4,089,680, Cl. 75-129.000.
Massey-Ferguson Services N.V.: *See*—
Quick, Donald J., 4,089,396, Cl. 192-56.00F.
Massy, Derek James Rowland; and Winterbottom, Kenneth, to Ciba-Geigy Corporation. Aqueous coating compositions containing a mercaptan polyester and an aminoplast. 4,089,827, Cl. 260-29.40R.
Masuko, Fujio: *See*—
Tsuji, Kozo; Fujimoto, Masanori; Masuko, Fujio; and Nagase, Tsuneyuki, 4,090,016, Cl. 536-1.000.
Mathieson, Thomas A.: *See*—
Kraska, Irvin R.; Mathieson, Thomas A.; Johnson, Richard N.; Lichodziejewski, Wieslaw L.; Gamache, David Leo; and Ash, Leon, 4,089,225, Cl. 73-614.000.
Matsuno, Yoshiyuki; Nohara, Tomiyasu; Komatsu, Fumiaki; and Imanishi, Nobuyuji, to Mitsubishi Jukogyo Kabushiki Kaisha; and Kabushibi Kaisha Kobe Seikosho. Slurry vessel with dewatering ports covering more than two percent of hold bottom. 4,089,284, Cl. 114-26.000.
Matsuo, Koichi: *See*—
Murakami, Noboru; Hirosawa, Koichiro; Ohara, Kazuo; and Matsuo, Koichi, 4,089,239, Cl. 74-761.000.
Matsushita Electric Industrial Company, Limited: *See*—
Kotera, Hiroaki; Hayami, Heijiro; Tsuchiya, Hiroyoshi; Kan, Ryuzo; Yoshida, Kunio; Shibata, Tsutomu; and Tsuda, Yukifumi, 4,090,243, Cl. 364-526.000.
Matsutomo, Katsumi: *See*—
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Matthews, Delbert K.: *See*—
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Mattsson, Hjalmar Egon; Severinsson, Lars Magnus; and Carsten, Bengt Erik, to Auto-Make Up. Method of repairing lacquer damage. 4,089,994, Cl. 427-140.000.
Matusjewski, Marian Richard: *See*—
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Maugis, Raymond: *See*—
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Mauser, James E.: *See*—
O'Hare, Stephen A.; Mauser, James E.; and Armantrout, Clo Elton, 4,089,812, Cl. 252-466.00J.
Maxfibe Foods, Inc.: *See*—
Richardson, Terence W., 4,089,981, Cl. 426-104.000.
May, Marvin I. Holder. 4,089,075, Cl. 5-370.000.
Mayama, Osamu: *See*—
Saito, Yuichi; and Mayama, Osamu, 4,089,682, Cl. 75-236.000.
Mayer & Cie., GmbH. & Co., Firma: *See*—
Hess, Otto; Dokter, Heinz; and Scherzinger, Werner, 4,089,279, Cl. 112-121.120.

Mazzeo, Charles F., to Amerace Corporation. Interference fit. 4,089,612, Cl. 403-361.000.

McAloon, Kevin Thomas, to Imperial Chemical Industries Limited. Electrolytic process. 4,089,758, Cl. 204-98.000.

McBurnett, James R.: *See*—
Ratliff, Frank W.; and McBurnett, James R., 4,089,166, Cl. 60-421.000.

McCarter, Craig A., to Hoffman Engineering Corporation. Photometric instrument with thermoelectric control of a photovoltaic semiconductor detector. 4,090,071, Cl. 250-238.000.

McCarthy, Edward F., to Standard Oil Company (Indiana). Method for improving calcium ion tolerance of hydrocarbon polymer sulfonate surfactants used in enhanced recovery processing in subterranean oil-bearing formations. 4,089,788, Cl. 252-8.55D.

McCorkle, Kenneth H.: *See*—
Norman, John H.; Russell, John L., Jr.; Porter, John T., II; McCorkle, Kenneth H.; Roemer, Thomas S.; and Sharp, Robert, 4,089,940, Cl. 423-648.00R.

McCrady, John: *See*—
Kilby, Jack S.; Schweitzer, Robert F.; and McCrady, John, 4,090,059, Cl. 219-216.000.

McCreary, Norman B. Long-life floodgate. 4,089,180, Cl. 61-29.000.

McDermott, Muriel: *See*—
Wade, Lisby Lucius; and McDermott, Muriel, 4,089,975, Cl. 424-322.000.

McDonnell Douglas Corporation: *See*—
Anderson, Alvin M.; Comley, William; and Engum, Douglas B., 4,089,494, Cl. 244-178.000.
Jakubowski, Thaddeus, Jr.; and Kietzman, Herman R., Jr., 4,089,250, Cl. 89-1.50F.
McIntyre, Robert G.; and Minnich, Otto J., 4,089,140, Cl. 52-98.000.

McGee, Michael Henry. Clothing for providing protection against forceful impact. 4,089,065, Cl. 2-2.000.

McGill, Eugene C.: *See*—
Reed, Robert D.; and McGill, Eugene C., 4,089,639, Cl. 431-211.000.

McGraw-Edison Company: *See*—
Gilker, Clyde; and Lamke, Arland D., 4,090,225, Cl. 361-3.000.

McGrew, James D. Multi-position paint roller frame. 4,089,082, Cl. 15-230.110.

McIntosh, Harold A.; Randolph, Hollis L.; and Hull, Bradford N., to Robertshaw Controls Company. Elongated snap-acting bimetal element. 4,090,163, Cl. 337-102.000.

McIntyre, Robert G.; and Minnich, Otto J., to McDonnell Douglas Corporation. Carpet installation for frangible aircraft floors. 4,089,140, Cl. 52-98.000.

McLain, Philippe Hardy-The, to Shakespeare Company. Ladder hook assembly and ladder. 4,089,390, Cl. 182-206.000.

McLain, Philippe Hardy-The, to Shakespeare Company. Apparatus for making fiber reinforced plastic members. 4,089,727, Cl. 156-350.000.

McLaughlin, Charles S. Swinging insect trap. 4,089,132, Cl. 43-136.000.

McMahon, Melvin B.; Guth, Lloyd A.; and Thomas, Larry A., to Encon Systems, Inc. Power management system. 4,090,088, Cl. 307-38.000.

McMullen, Arthur G.; Ruscoe, Michael J. H.; Clegg, Maurice A.; and Prowse, Ronald L., to Sherritt Gordon Mines Limited. Process for the production of nickel clad steel coinage blank. 4,089,753, Cl. 204-23.000.

McMurray, Russell L. Process for the separation of agglomerated carbonaceous particles from associated inorganic materials. 4,089,776, Cl. 209-5.000.

McWhorter, Edward Milton. Intra-articulate connecting rod for small engines. 4,089,235, Cl. 74-579.00E.

MDH Industries Inc.: *See*—
Marshall, J. Howard, III; and Harrington, Timothy M., 4,090,082, Cl. 250-375.000.

Mead Corporation, The: *See*—
Huffman, Harold W.; Lyon, Richard H.; Holmes, David G.; and Donahue, John W., 4,090,205, Cl. 346-75.000.
Wood, Prentice J.; and Plaxico, Robert E., 4,089,457, Cl. 229-15.000.

Means, Rodney J.: *See*—
Hepworth, Edward C.; and Means, Rodney J., 4,090,256, Cl. 365-154.000.

Meca S.n.c.: *See*—
Landoni, Giannino, 4,089,281, Cl. 112-221.000.

Meehan, Michael John: *See*—
Soper, Peter Henry Hunt; Meehan, Michael John; and Rouse, John Reginald, 4,089,102, Cl. 29-527.500.

Meggs, Daniel H.: *See*—
Beny, Janos; and Meggs, Daniel H., 4,089,135, Cl. 49-257.000.

Meier, John George: *See*—
Baumgartner, Henri; Jacquemet, Andre; Meier, John George; and Vollerin, Bernard, 4,089,629, Cl. 431-9.000.

Meinhardt, Norman Anthony, to Lubrizol Corporation, The. Preparation and use of basic metal salt compositions of phosphorus-containing acids. 4,089,793, Cl. 252-32.70E.

Mekontrol, Incorporated: *See*—
Shaw, Raymond J., 4,089,269, Cl. 104-88.000.

Melchior, Jean; and Andre, Thierry, to Etat Francais. Supercharged internal combustion engines. 4,089,173, Cl. 60-606.000.

Mellard, George K. Mailbox signal. 4,089,460, Cl. 232-34.000.

Merck & Co., Inc.: *See*—
Prugh, John D., 4,089,864, Cl. 260-293.620.

Merianos, John J.: *See*—
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,089,977, Cl. 424-329.000.

Merk, Wolfgang; Schreyer, Gerd; and Weigel, Horst, to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler. Process for the production of skatylhydantoin. 4,090,024, Cl. 548-309.000.

Merrell, Richard G., to Zenith Radio Corporation. Digital phase comparator with reset. 4,090,143, Cl. 328-134.000.

Merten, Rudolf; and Rottmaier, Ludwig, to Bayer Aktiengesellschaft. Preparation of hydantoins by reacting esters of ethylene-1,2-dicarboxylic acids and ureas and thioureas. 4,089,860, Cl. 544-295.000.

Mertens, Marc Frans; and Wantiez, Bernard, to Rheem Manufacturing Company. Metallic container and method for making the same. 4,089,283, Cl. 113-120.00K.

Mertzweiller nee Maillard, Anne-Marie; and Etienne, Guy, to Air-Industrie. Compositions for denaturing paints, especially for cleaning painting cabins. 4,090,001, Cl. 427-444.000.

Mescall, John F.; and Riffin, Paul V., to United States of America, Army. High fragmentation munition. 4,089,267, Cl. 102-67.000.

Messenger, Joseph U., to Mobil Oil Corporation. Cementing against evaporites. 4,089,376, Cl. 166-293.000.

Meszaros, Zoltan; Knoll, Jozsef; Hermecz, Istvan; Simon, Piroska; Szentmiklosy, Peter; Vasvari, Lelle; Horvath, Agnes; Horvath, Gabor; and Dvortsak, Peter, to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt. Heterocyclic-amino-acrylic acid derivatives. 4,089,858, Cl. 260-295.00R.

Metal Box Limited: *See*—
Tebbutt, Charles N.; and Still, Charles D. V., 4,090,004, Cl. 428-64.000.

Metal Sales Company (Proprietary) Limited: *See*—
Scherzinger, Rudolf, 4,089,715, Cl. 149-6.000.

Metallgesellschaft Aktiengesellschaft: *See*—
Baron, Gerhard; Rudolph, Paul; Kohlen, Rudolf; and Hafke, Carl, 4,089,659, Cl. 48-197.00R.

Metramatic Corp.: *See*—
Vanderhoof, Frank B., 4,089,408, Cl. 198-848.000.

Meyer, Burton C.; Imatt, Alex; and Brand, Derek R., to Marvin Glass & Associates. Phonograph device. 4,089,598, Cl. 353-17.000.

Meyers, George Leroy; and Kuehl, Donald Roy, to American Can Company. Blank for compartmentalized tray. 4,089,458, Cl. 229-32.000.

Meyers, Paul A.: *See*—
Berst, Theodore H.; and Meyers, Paul A., 4,089,521, Cl. 273-29.00A.

Michael, John Graham. Method of making school ring top. 4,089,096, Cl. 29-160.600.

Michaelis, Walfried; Muller, Agmar; Fanger, Hans Ulrich; and Pepelnik, Rudolf, to Gesellschaft fur Kernenergie in Schiffbau u. Schiffahrt mbH. Method for determination of economically interesting metals in content of manganese nodules. 4,090,072, Cl. 250-255.000.

Michigan Oven Company: *See*—
Konczalski, Ronald L., 4,089,088, Cl. 23-277.00C.

Microdot Inc.: *See*—
Knudson, Charles B., 4,089,533, Cl. 277-152.000.

Miki, Tamotsu; Narisawa, Shizuo; Ichikawa, Ichiro; and Horiike, Hideki, to Sumitomo Chemical Company, Limited. Process for producing transparent block copolymer resin. 4,089,913, Cl. 260-880.00B.

Mikulecky, Harvey W., to RTE Corporation. Fuse having a threaded support structure. 4,090,164, Cl. 337-159.000.

Milam, Joseph E.; Dean, Warren E.; and Gerdes, Robert K., to PPG Industries, Inc. Separation of dichlorobenzene isomers. 4,089,909, Cl. 260-650.00R.

Milberger, Ernest C.: *See*—
Bremer, Noel J.; White, James F.; and Milberger, Ernest C., 4,089,870, Cl. 260-346.750.

Miles, Denny Herschel, Sr.; Miles, Larry Willis, Sr.; and Miles, Jewell Willis. Adjustable height outboard motor mounting. 4,089,290, Cl. 115-41.00R.

Miles, Jewell Willis: *See*—
Miles, Denny Herschel, Sr.; Miles, Larry Willis, Sr.; and Miles, Jewell Willis, 4,089,290, Cl. 115-41.00R.

Miles, Larry Willis, Sr.: *See*—
Miles, Denny Herschel, Sr.; Miles, Larry Willis, Sr.; and Miles, Jewell Willis, 4,089,290, Cl. 115-41.00R.

Milianowicz, Stanislaw A.: *See*—
Frink, Russell E.; and Milianowicz, Stanislaw A., 4,090,051, Cl. 200-144.00R.

Millard, Richard J.; and Poat, David R., to Sprague Electric Company. Screen printed solid electrolytic capacitor. 4,090,231, Cl. 361-433.000.

Miller, Arthur C. Modular knock-out cavity forming inserts. 4,089,502, Cl. 249-177.000.

Miller, Craig S.: *See*—
Miller, Curtis G.; and Miller, Craig S., 4,089,497, Cl. 248-345.100.

Miller, Curtis G.; and Miller, Craig S. Rail cap. 4,089,497, Cl. 248-345.100.

Miller, Howard A.; Smith, Robert R.; and Nichols, Charles S., to United States of America, Navy. Solid filled vibration isolation module for a towed sonar array. 4,090,168, Cl. 340-3.00T.

Miller, Joe, to Lawrence Peska Associates, Inc. Billfold anti-theft device. 4,090,183, Cl. 340-280.000.

Miller, Wendell E., to Scott & Fetzer Company, The. Pressure actuated signal fluid control for load responsive systems. 4,089,169, Cl. 60-445.000.

Milliken Research Corporation: *See*—
Fay, Robert C., 4,089,717, Cl. 156-72.000.

Milstein, Donald: *See—*
Oleck, Stephen M.; Sherry, Howard S.; Fischer, Ronald H.; and Milstein, Donald, 4,089,774, Cl. 208-89.000.

Milum, Jimmy L., to Emerson Electric Co. Two stage electrostatic precipitator. 4,089,661, Cl. 55-137.000.

Minakata, Matsuo: *See—*
Sando, Yoshikazu; Minakata, Matsuo; Ishidoshiro, Hiroshi; Tomatsu, Masanobu; and Kamei, Isao, 4,089,194, Cl. 68-5.00E.

Minnesota Mining and Manufacturing Company: *See—*
Lange, Roger W.; and Sowman, Harold G., 4,089,996, Cl. 427-160.000.
Taylor, Allen L., 4,089,927, Cl. 310-331.000.
Williams, Todd R.; and Sirvio, Larry M., 4,089,897, Cl. 260-514.00D.
Williams, Todd R.; and Sirvio, Larry M., 4,090,019, Cl. 542-426.000.

Minnich, Otto J.: *See—*
McIntyre, Robert G.; and Minnich, Otto J., 4,089,140, Cl. 52-98.000.

Minolta Camera Kabushiki Kaisha: *See—*
Sakata, Shigeyoshi, 4,089,590, Cl. 350-187.000.

Miserlis, Constantine D.; and Lewis, Peter J., to Badger Company, The. Method of pump-around cooling reaction mass during polymerization of olefins. 4,089,365, Cl. 165-1.000.

Mishev, Georgi Nikolov; and Haralampiev, Iliya Stoilkov, to DSO "Balkankar". Apparatus for the production of pipe-type armored separators for storage batteries. 4,089,627, Cl. 425-303.000.

Mitsubishi Chemical Industries Ltd.: *See—*
Akiyoshi, Osamu; Mukai, Akio; and Miwa, Yoshihiro, 4,089,934, Cl. 423-448.000.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Kinase, Takeo; Yano, Isamu; Okubo, Kanichi; Kitakoga, Hidetoshi; and Tayama, Hiromitsu, 4,089,178, Cl. 61-1.00F.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Matsuno, Yoshiyuki; Nohara, Tomiyasu; Komatsu, Fumiaki; and Imanishi, Nobuyuji, 4,089,284, Cl. 114-26.000.

Mitsubishi Kinzoku Kabushiki Kaisha: *See—*
Saito, Yuichi; and Mayama, Osamu, 4,089,682, Cl. 75-236.000.

Mitsui Sugar Co., Ltd.: *See—*
Shimizu, Junichi; and Iwakura, Tatsuya, 4,089,701, Cl. 127-61.000.

Mitter & Co.: *See—*
Mitter, Mathias, 4,089,193, Cl. 68-5.00D.

Mitter, Mathias, to Mitter & Co. Machine for printing on textile webs. 4,089,193, Cl. 68-5.00D.

Miura, Mitsuo: *See—*
Endo, Masaaki; Miura, Mitsuo; and Kukino, Yoshinori, 4,089,183, Cl. 61-50.000.

Miura, Norio: *See—*
Shimiya, Keiji; Miura, Norio; Takano, Masao; and Ishigaki, Kunio, 4,090,085, Cl. 250-483.000.

Miura, Yasuo: *See—*
Itoh, Yoshio; Satoh, Kakuji; Suzuki, Yuji; Miura, Yasuo; Kazama, Yoshiteru; and Yazawa, Saburo, 4,089,911, Cl. 260-859.0PV.

Miwa, Yoshihiro: *See—*
Akiyoshi, Osamu; Mukai, Akio; and Miwa, Yoshihiro, 4,089,934, Cl. 423-448.000.

Miyahara, Kingo, to Dowa Co., Ltd. Method and apparatus for the production of wrapped foods. 4,089,982, Cl. 426-107.000.

Miyao, Saisei: *See—*
Nagano, Tadashi; Miyao, Saisei; and Takeda, Katsuhiko, 4,089,737, Cl. 162-19.000.

Mizumoto, Masakatsu; and Yamashita, Hisateru, to Kabushiki Kaisha Komatsu Seisakusho. Transfer press. 4,089,205, Cl. 72-450.000.

Mizuno, Nobuhisa: *See—*
Sugiyama, Hiroshi; Yoshitake, Kuniki; Sakata, Nobuhiko; Sugioka, Taizo; and Mizuno, Nobuhisa, 4,089,798, Cl. 252-188.000.

Mizuno, Sueo: *See—*
Tamada, Kazumi; Mizuno, Sueo; Takase, Tadayoshi; Koumura, Masahiko; and Soma, Shinichi, 4,089,319, Cl. 126-21.00A.

Mizusawa, Akira, to Nifco Inc. Cord grommet. 4,089,496, Cl. 248-56.000.

Mobil Oil Corporation: *See—*
Espenscheid, Wilton F., 4,089,773, Cl. 208-8.000.
Messenger, Joseph U., 4,089,376, Cl. 166-293.000.
Oleck, Stephen M.; Sherry, Howard S.; Fischer, Ronald H.; and Milstein, Donald, 4,089,774, Cl. 208-89.000.

Mochizuki, Shigeaki: *See—*
Tokumitsu, Ichiro; Konuma, Hideo; Mochizuki, Shigeaki; Morotomi, Kohichi; Murai, Norio; and Koyama, Mikio, 4,089,888, Cl. 260-463.000.

Mockli, Peter, to Ciba-Geigy AG. Process for the dyeing of paper material. 4,089,647, Cl. 8-7.000.

Moffa, Joseph; and Boynton, Jerald H., to Armco Steel Corporation. Segmented cylindrical reinforced plastic manhole structure. 4,089,139, Cl. 52-20.000.

Molins Machine Company, Inc.: *See—*
Mooney, John F.; and Woolston, Allen Brent, 4,089,482, Cl. 242-58.100.

Molls, Hans-Heinz: *See—*
Brandt, Horst; Hornle, Reinhold; Wolf, Karlheinz; and Molls, Hans-Heinz, 4,089,700, Cl. 106-309.000.

Monark-Crescent AB: *See—*
Liljequist, Sten Ivar Helmer, 4,089,540, Cl. 280-259.000.

Mondt, Josef; Rauterkus, Karl Josef; Lehmann, Heinz; Stelzel, Werner; and Vitzthum, Hans, to Hoechst Aktiengesellschaft. Impregnation and primer coating of absorptive substrates with plastics dispersions. 4,089,999, Cl. 427-385.00R.

Monroe Auto Equipment Company: *See—*
Palmer, Dale A., 4,089,511, Cl. 267-8.00R.

Monsanto Company: *See—*
Dobo, Emerick J., 4,089,921, Cl. 264-63.000.
Dutra, Gerard A., 4,089,671, Cl. 71-86.000.
Haley, David J., 4,089,720, Cl. 156-181.000.
Morita, Eiichi, 4,089,902, Cl. 260-570.900.

Montavon, Marc: *See—*
Bohni, Erika; and Montavon, Marc, 4,089,950, Cl. 424-229.000.

Montedison S.p.A.: *See—*
Zucchini, Umberto; and Cuffiani, Illaro, 4,089,808, Cl. 252-429.00C.

Mooney, John F.; and Woolston, Allen Brent, to Molins Machine Company, Inc. Automatic web splice control system. 4,089,482, Cl. 242-58.100.

Morelle, Jean V.; and Lauzanne-Morelle, Eliane M.-T. Metal salts of fatty acid derivatives of amino acids. 4,089,954, Cl. 424-245.000.

Morello, Philip P.; and Seroski, David M. Sequential coded computerized anti-theft lock. 4,090,089, Cl. 307-40.000.

Morenus, Richard Jay: *See—*
Houser, David Erle; and Morenus, Richard Jay, 4,089,452, Cl. 226-157.000.

Morgan, Donald F.: *See—*
Triolo, Louis J.; and Morgan, Donald F., 4,089,718, Cl. 156-122.000.

Morgan, James L. Protective armor with panels movable with respect to each other. 4,090,005, Cl. 428-76.000.

Mori, Shigeo; Murakami, Fumikazu; Hara, Yoshiaki; Horikoshi, Ichiro; and Takahashi, Souya, to Kabushiki Kaisha Daini Seikosha. Electromagnetic sonic generator for an alarm. 4,090,041, Cl. 179-115.00R.

Mori, Yasumasa: *See—*
Yasutome, Osamu; Takeda, Mitsuo; Mori, Yasumasa; and Sawamura, Tagayasu, 4,090,102, Cl. 313-317.000.

Mori, Yoshihisa; and Shimura, Kazuo, to Sony Corporation. Electrodynamic transducer. 4,090,039, Cl. 179-100.41D.

Morita, Eiichi, to Monsanto Company. Diallylaminomethyl-resorcinols. 4,089,902, Cl. 260-570.900.

Morita, Shizuo; and Kimura, Kiyoshi, to Konishiroku Photo Industry Co., Ltd. Developing apparatus of magnetic brush type for electrophotographic reproduction. 4,089,297, Cl. 118-647.000.

Morita, Yazaemon; Kogure, Yukitoshi; and Nomura, Akira, to Director-General of the Agency of Industrial Science & Technology. Process for the production of spherical silica gel. 4,089,932, Cl. 423-338.000.

Moritani, Masahiko: *See—*
Kato, Yasuyuki; Moritani, Masahiko; and Suzuki, Seiichi, 4,089,918, Cl. 264-40.700.

Moritz, Lyle E.; and Fortuin, John L., to Robinson Knife Manufacturing Co., Inc. Thread snip. 4,089,113, Cl. 30-253.000.

Morotomi, Kohichi: *See—*
Tokumitsu, Ichiro; Konuma, Hideo; Mochizuki, Shigeaki; Morotomi, Kohichi; Murai, Norio; and Koyama, Mikio, 4,089,888, Cl. 260-463.000.

Morrison, Jasper J.: *See—*
Jaroska, Miles F.; Niven, William A.; and Morrison, Jasper J., 4,089,268, Cl. 102-70.20R.

Morrow, Richard A.: *See—*
Canty, Eugene T.; Tow, Russell P.; Spayth, Frank J.; Morrow, Richard A.; and Smith, Charlie B., 4,090,198, Cl. 343-18.00D.

Morse, James H.: *See—*
Lerner, Moisey M.; and Morse, James H., 4,089,756, Cl. 204-58.000.

Morton, Arthur P. Combination tool. 4,089,077, Cl. 7-138.000.

Morton, James L.; Birchell, Thomas H.; Noble, James M.; and Jenson, David W., to Seltec Corporation. Composition control system for an asphalt plant. 4,089,509, Cl. 366-8.000.

Moskvichev, Viktor Fedorovich: *See—*
Lipets, Adolf Usherovich; Moskvichev, Viktor Fedorovich; Katyshev, Georgy Viktorovich; Artemov, Lev Nikolaevich; Bakanov, Anatoly Fedorovich; Shamarokova, Raisa Nikiforovna; Dolgy, Alexei Arsentievich; Eletsky, Stanislav Alexandrovich; Grinberg, Yakov Natanovich; Ardamatsky, Vitaly Andreevich; Vivsik, Svyatoslav Nikolaevich; Zavedeev, Vasily Evdokimovich; Zevin, Ilya Julievich; and Fadeev, Evgeny Alexeevich, 4,089,369, Cl. 165-158.000.

Moss, Noel Sydney; and Small, Michael Peter, to Ciba-Geigy Corporation. New curing agents for epoxide resins. 4,089,826, Cl. 260-29.2EP.

Mostyn, William Max; Verrall, Roger Percy; and Shrimpton, Brian Clifford, to General Foods Ltd. Starch based dessert composition. 4,089,988, Cl. 426-578.000.

Motorola, Inc.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,090,236, Cl. 364-200.
Dydyk, Michael, 4,090,152, Cl. 331-102.000.
Hepworth, Edward C.; and Means, Rodney J., 4,090,256, Cl. 365-154.000.
Padgitt, Kenneth Warren, 4,089,316, Cl. 123-146.50A.

Moylan, Philip John, to Bell Telephone Laboratories, Incorporated. Usage-sensitive billing arrangement for private branch exchange subscribers. 4,090,034, Cl. 179-7.10R.

Muchowski, Joseph M.; and Kluge, Arthur F., to Syntex (U.S.A.) Inc. 5-Aroyl-1,2-dihydro-3H-pyrrolo[1,2-a]pyrrole-1-carboxylic acid derivatives and process for the production thereof. 4,089,969, Cl. 424-274.000.

Mueller, Helmut: *See—*
Bronstert, Klaus; Ladenberger, Volker; Druschke, Wolfgang; Groh, Wolfgang; and Mueller, Helmut, 4,089,824, Cl. 260-27.0BB.

Mukai, Akio: *See—*
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Muller, Agmar: *See—*
Michaelis, Walfried; Muller, Agmar; Fanger, Hans Ulrich; and Pepelnik, Rudolf, 4,090,072, Cl. 250-255.000.

Mullins, Barry W.: *See—*
Cencel, J. Arthur; Voge, Andrew; and Mullins, Barry W., 4,090,229, Cl. 361-288.000.

Mulvihill, James W.: *See—*
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Munekata, Seiji: *See—*
Yamabe, Masaaki; Munekata, Seiji; Kumai, Seisaku; and Samejima, Shunichi, 4,089,869, Cl. 260-343.500.

Murai, Norio: *See—*
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Murakami, Fumikazu: *See—*
Mori, Shigeo; Murakami, Fumikazu; Hara, Yoshiaki; Horikoshi, Ichiro; and Takahashi, Souya, 4,090,041, Cl. 179-115.00R.

Murakami, Noboru; Hirosawa, Koichiro; Ohara, Kazuo; and Matsuo, Koichi, to Aisin Seiki Kabushiki Kaisha. Speed change gear system. 4,089,239, Cl. 74-761.000.

Murase, Ichiki: *See—*
Sano, Takezo; Kobayashi, Akira; and Murase, Ichiki, 4,089,816, Cl. 260-2.20R.

Murata, Masahiro, to Hope Co. Ltd. Ski boot heel binding having improved unlocking device. 4,089,541, Cl. 280-631.000.

Muratsuka, Hiroshi; and Aida, Yoshio, to Trio Kabushiki Kaisha. Circuit pattern for a protection circuit of a stereo amplifier. 4,090,148, Cl. 330-207.00P.

Musgrave, Daniel D. Explosive barrier wire. 4,089,266, Cl. 102-8.000.

Mutsuta, Akio: *See—*
Arai, Izumi; Yamada, Yasuteru; Mutsuta, Akio; Hirano, Hirotoshi; and Tuchida, Yasuzou, 4,089,507, Cl. 366-102.000.

Muzyczko, Thaddeus M.; Shore, Samuel; and Martin, Jerome A., to Richardson Company, The. Corrosion inhibitors. 4,089,789, Cl. 252-8.55E.

Myers, Donald R. Camper cooking and dining unit. 4,089,554, Cl. 296-24.00A.

N.P.I. Corporation: *See—*
Brown, John S.; and Forney, Robert B., 4,089,260, Cl. 99-386.000.

Nagami, Akira, to Nippon Electric Co., Ltd. Timing signal generator circuit. 4,090,096, Cl. 307-269.000.

Nagano, Tadashi; Miyao, Saisei; and Takeda, Katsuhiko, to Toyo Pulp Company, Ltd. Delignification of cellulosic material with an alkaline aqueous medium containing oxygen dissolved therein. 4,089,737, Cl. 162-19.000.

Nagase, Tsuneyuki: *See—*
Tsuji, Kozo; Fujimoto, Masanori; Masuko, Fujio; and Nagase, Tsuneyuki, 4,090,016, Cl. 536-1.000.

Nagorny, Claus: *See—*
Steimann, Franz; and Nagorny, Claus, 4,089,424, Cl. 212-4.000.

Najmann, Knut: *See—*
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Nakagome, Yukio; Teramura, Hiroichi; Yamazaki, Yasuhiro; and Wakahara, Yasushi, to Kokusai Denshin Denwa Kabushiki Kaisha. Facsimile signal reception system. 4,090,222, Cl. 358-280.000.

Nakajyo, Susumu: *See—*
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Nakamoto, Soichi: *See—*
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Nakamura, Koyo, to Nissan Motor Company, Limited. Throttle valve operating mechanism. 4,089,307, Cl. 123-97.00B.

Nakano, Yoshikatsu: *See—*
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Nalco Chemical Company: *See—*
Scott, James E., 4,089,651, Cl. 21-2.70R.
Svarz, Jerry J.; Kemmer, Frank N.; and Fabri, Jon O., 4,089,780, Cl. 210-53.000.

Narimatsu, Takeshi: *See—*
Noguchi, Koichi; Watanuki, Masayosi; Narimatsu, Takeshi; and Yoshida, Mitsutaka, 4,089,602, Cl. 355-69.000.

Narisawa, Shizuo: *See—*
Miki, Tamotsu; Narisawa, Shizuo; Ichikawa, Ichiro; and Horiike, Hideki, 4,089,913, Cl. 260-880.00B.

Naskar, Sasanka Sekhar; Renckhoff, Gustav; Heers, Wolfgang; and Pass, Reinhard, to Dynamit Nobel Aktiengesellschaft. Surface active, liquid ester mixtures containing hydroxyl, and a method of preparing same. 4,089,879, Cl. 260-410.700.

Nassar, Jorge J.: *See—*
Berger, Kenneth L.; Nassar, Jorge J.; and Benken, William B., 4,089,980, Cl. 426-69.000.

National Institute for Metallurgy: *See—*
De Villiers, Johan P. R.; and Ormrod, George T. W., 4,090,073, Cl. 250-273.000.

National Mine Service Company: *See—*
Freed, Donald L., Jr.; and Baum, Gerald L., 4,089,403, Cl. 198-316.000.

National Molding Corporation: *See—*
Anscher, Bernard, 4,089,248, Cl. 85-71.000.

National Research Institute for Metals: *See—*
Okada, Akira, 4,090,057, Cl. 219-122.000.

National Semiconductor Corporation: *See—*
Harris, James M., 4,089,709, Cl. 148-6.270.

National Starch and Chemical Corp.: *See—*
Ganslaw, Stuart H.; and Katz, Howard G., 4,090,013, Cl. 526-15.000.

Navone, Lorenzo, to Ing. C. Olivetti & C., S.p.A. Disposable toner cartridge for copying machines. 4,089,601, Cl. 355-14.000.

NCR Corporation: *See—*
Foris, Peter L.; Brown, Robert W.; and Phillips, Paul S., Jr., 4,089,802, Cl. 252-316.000.

Neal, John A., to Georgia-Pacific Corporation. Clarification process. 4,089,779, Cl. 210-42.00S.

Neilsen, Hildaur L. Deburring apparatus. 4,089,204, Cl. 72-412.000.

Nelson, John: *See—*
Yeo, Herbert G.; and Nelson, John, 4,089,105, Cl. 29-626.000.

Nelson, Merritt J., to Zin-Plas Corporation. Waste and overflow plate assembly. 4,089,230, Cl. 74-97.000.

Nelson, Robert A.; and Saul, Glenn, to Honeywell Inc. Control circuit. 4,090,121, Cl. 318-610.000.

Nemeck, Jozef: *See—*
Dart, Edward Charles; Cantwell, John Burnett; Traynor, James Rodney; Jaworzyn, Joseph Franciszek; and Nemeck, Jozef, 4,089,763, Cl. 204-159.230.

Nesbet, Robert Kenyon: *See—*
Hunziker, Heinrich Erwin; and Nesbet, Robert Kenyon, 4,090,076, Cl. 250-305.000.

Neu, Francis, to Societe Anonyme des Etablissements Neu. Apparatus for pneumatic conveyance of pulverulent or granular materials. 4,089,563, Cl. 302-35.000.

New England Power Service Company: *See—*
Kittrell, James R.; and Herman, Donald L., 4,089,930, Cl. 423-239.000.

Newburger, Susan; and Keaney, John D. Aligning tool for strings of racket. 4,089,523, Cl. 273-73.00R.

Newman, Stanley R.: *See—*
Duranleau, Roger G.; Larkin, John M.; and Newman, Stanley R., 4,089,867, Cl. 260-307.00G.

Newton, Milton A., Jr. Starting block assembly. 4,089,519, Cl. 272-105.000.

Nichols, Charles S.: *See—*
Miller, Howard A.; Smith, Robert R.; and Nichols, Charles S., 4,090,168, Cl. 340-3.00T.

Nichols, Donald R.: *See—*
Doo, Ven Y.; Nichols, Donald R.; and Silvey, Gene A., 4,089,992, Cl. 427-94.000.

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Nicholson, Lincoln E., to Raymond Lee Organization, Inc., The, a part interest. Rotary washing brush device. 4,089,079, Cl. 15-29.000.

Nickel, Werner: *See—*
Lisfeld, Robert; Nickel, Werner; and Reinheimer, Guenter, 4,090,069, Cl. 250-201.000.

Nickolson, Robert, to Schering Aktiengesellschaft. Process for the preparation of 21-hydroxy-16-pregnen-20-one derivatives. 4,089,852, Cl. 260-239.55R.

Nicolosi, Joseph P.; and Turner, Michael M. Physical therapy apparatus and method. 4,089,330, Cl. 128-25.00R.

Nidy, Eldon G.: *See—*
Kornis, Gabriel; Nidy, Eldon G.; Vostral, Henry J.; and Steinhards, Arnolds, deceased, 4,089,672, Cl. 71-92.000.

Nifco Inc.: *See—*
Mizusawa, Akira, 4,089,496, Cl. 248-56.000.

Nijhawan, Pramodh: *See—*
Overmyer, Robert C.; and Nijhawan, Pramodh, 4,089,640, Cl. 432-73.000.

Nippi, Incorporated: *See—*
Utsuo, Akira; and Matsutomo, Katsumi, 4,089,333, Cl. 128-156.000.

Nippon Cable System Inc.: *See—*
Baba, Masanao, 4,089,397, Cl. 192-.096.

Nippon Electric Co., Ltd.: *See—*
Nagami, Akira, 4,090,096, Cl. 307-269.000.
Soma, Shoji; and Sato, Ikuro, 4,090,137, Cl. 325-60.000.

Nippon Evr Limited: *See—*
Ono, Takezo, 4,089,760, Cl. 204-109.000.

Nippon Soken, Inc.: *See—*
Egami, Tsuneyuki; Kawai, Hisasi; Kohama, Tokio; and Obayashi, Hideki, 4,089,214, Cl. 73-116.000.
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,089,310, Cl. 123-119.0LR.

Nippondenso Co., Ltd.: *See—*
Kosuge, Shuichi, 4,090,194, Cl. 340-414.000.

Nishikuri, Masao: *See—*
Ohshima, Taizo; Nishikuri, Masao; Suzuki, Yasuyuki; and Yamada, Kunio, 4,089,648, Cl. 8-39.00R.

Nishimoto, Tsunanori: *See—*
Okamoto, Tomiyasu; Nishimoto, Tsunanori; Sawada, Kaoru; Hayakawa, Koji; and Kurihara, Tomomichi, 4,089,285, Cl. 114-74.00A.

Nissan Denshi Kabushiki Kaisha: *See—*
Arai, Kazuo, 4,090,134, Cl. 325-15.000.

Nissan Motor Company, Limited: *See—*
Asano, Masaharu; and Manaka, Nobuzi, 4,089,313, Cl. 123-119.0EC.

Iwasa, Yoshio, 4,089,164, Cl. 60-282.000.
Koike, Shyouichi, 4,089,134, Cl. 49-227.000.
Nakamura, Koyo, 4,089,307, Cl. 123-97.00B.
Yokota, Akinori, 4,089,221, Cl. 73-252.000.

Nitanda, Hiroshi: *See*—
Ito, Yoshio; Katayama, Hajime; Nitanda, Hiroshi; and Yamaguchi, Masaru, 4,089,600, Cl. 355-3.0CH.

Nitro Nobel AB: *See*—
Enoksson, Bertil Petrus; and Eriksson, Lars Uno Lennart, 4,089,702, Cl. 134-1.000.

Niven, William A.: *See*—
Jaroska, Miles F.; Niven, William A.; and Morrison, Jasper J., 4,089,268, Cl. 102-70.20R.

Nivet, Andre, to ITW de France, S.A. Automatic tool for setting rivets or like fasteners supplied in strip form. 4,089,099, Cl. 29-243.530.

Noble, James M.: *See*—
Morton, James L.; Birchell, Thomas H.; Noble, James M.; and Jenson, David W., 4,089,509, Cl. 366-8.000.

Nogami, Tomoyuki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Sealed reservoir for brake master cylinder. 4,090,049, Cl. 200-84.00C.

Noguchi, Koichi; Watanuki, Masayosi; Narimatsu, Takeshi; and Yoshida, Mitsutaka, to Ricoh Company, Ltd. Automatic shutdown system for electrophotographic apparatus. 4,089,602, Cl. 355-69.000.

Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, to Nippon Soken, Inc. Internal combustion engine providing improved exhaust-gas purification. 4,089,310, Cl. 123-119.0LR.

Nohara, Tomiyasu: *See*—
Matsuno, Yoshiyuki; Nohara, Tomiyasu; Komatsu, Fumiaki; and Imanishi, Nobuyuji, 4,089,284, Cl. 114-26.000.

Noland, Richard D., to Air-O-Matics, Inc. Bag holder for self-cleaning bag filter. 4,089,664, Cl. 55-341.00R.

Nomura, Akira: *See*—
Morita, Yazaemon; Kogure, Yukitoshi; and Nomura, Akira, 4,089,932, Cl. 423-338.000.

Norman, John H.; Russell, John L., Jr.; and Stowell, Susan A., to General Atomic Company. Process for the production of hydrogen from water. 4,089,939, Cl. 423-648.00R.

Norman, John H.; Russell, John L., Jr.; Porter, John T., II; McCorkle, Kenneth H.; Roemer, Thomas S.; and Sharp, Robert, to General Atomic Company. Process for the thermochemical production of hydrogen. 4,089,940, Cl. 423-648.00R.

Norris, Elwood G. Combination smoke detector and lamp structure. 4,090,178, Cl. 340-237.00S.

North American Specialties Corp.: *See*—
Seidler, Jack, 4,089,106, Cl. 29-630.00C.

Northern Telecom Limited: *See*—
King, Frederick David, 4,090,055, Cl. 219-10.55R.

Northern Utilities Service Company: *See*—
Kittrell, James R.; and Herman, Donald L., 4,089,930, Cl. 423-239.000.

Northrop Corporation: *See*—
Polczynski, Christopher E., 4,089,584, Cl. 350-96.160.

Nowacki, Louis J.: *See*—
Luttinger, Manfred; Cremeans, George E.; and Nowacki, Louis J., 4,089,837, Cl. 260-38.000.

Nozawa, Takamitsu: *See*—
Saito, Tadao; Nozawa, Takamitsu; and Yamanka, Nobuo, 4,089,922, Cl. 264-108.000.

N.V. Internationale Octrooi Maatschappij "OCTROPA": *See*—
Tjaden, Jan, 4,089,324, Cl. 126-271.000.

Obayashi, Hideki: *See*—
Egami, Tsuneyuki; Kawai, Hisasi; Kohama, Tokio; and Obayashi, Hideki, 4,089,214, Cl. 73-116.000.

Oberg, Ulf Erik, to Saab-Scania Aktiebolag. Method and apparatus for predicting vehicle speed in braking control systems for wheeled vehicles. 4,089,564, Cl. 303-109.000.

Obra, Bart R., to Easom Engineering & Manufacturing Corporation. Motion generating mechanism. 4,089,228, Cl. 74-52.000.

Occidental Oil Shale, Inc.: *See*—
Cha, Chang Yul, 4,089,375, Cl. 166-261.000.

Occidental Petroleum Corporation: *See*—
Woinsky, Samuel G., 4,089,175, Cl. 60-641.000.

O'Connor, Dennis J. Fiber-reinforced plastic tool handle. 4,089,356, Cl. 145-29.00R.

Oddo, Donald J.: *See*—
Lasiewicz, Thaddeus W.; Wrabl, Otto; and Oddo, Donald J., 4,089,294, Cl. 118-230.000.

Odetics, Inc.: *See*—
Lerma, Jesse P.; and Lindquist, Charles A., 4,090,242, Cl. 364-514.000.

Oeda, Komao. Circuit breaker. 4,090,158, Cl. 335-17.000.

Oehmsen, Erich; and Oehmsen, Karl H., to Oehmsen Plastic Greenhouse Mfg. Inc. Structural truss assembly. 4,089,148, Cl. 52-693.000.

Oehmsen, Karl H.: *See*—
Oehmsen, Erich; and Oehmsen, Karl H., 4,089,148, Cl. 52-693.000.

Oehmsen Plastic Greenhouse Mfg. Inc.: *See*—
Oehmsen, Erich; and Oehmsen, Karl H., 4,089,148, Cl. 52-693.000.

Oertel, Harald: *See*—
Lantzsch, Reinhard; Uhrhan, Paul; Oertel, Harald; Roos, Ernst; and Arlt, Dieter, 4,089,841, Cl. 260-45.8SN.

Ogawa, Seiichi; and Sumiya, Hiroyuki, to Sony Corporation. Convergence means for color cathode ray tube. 4,090,110, Cl. 315-368.000.

Ogishi, Masaaki, to Yoshida Kogyo, K.K. Method of driving door of automatic door assembly. 4,090,113, Cl. 318-282.000.

O'Hanlon, Edward J. Means and methods for sending heat downwardly. 4,089,366, Cl. 165-1.000.

Ohara, Kazuo: *See*—
Murakami, Noboru; Hirosawa, Koichiro; Ohara, Kazuo; and Matsuo, Koichi, 4,089,239, Cl. 74-761.000.

O'Hare, Stephen A.; Mauser, James E.; and Armantrout, Clo Elton, to United States of America, Interior. Massive catalyst. 4,089,812, Cl. 252-466.00J.

Ohshima, Taizo; Nishikuri, Masao; Suzuki, Yasuyuki; and Yamada, Kunio, to Sumitomo Chemical Company, Limited. Process for dry dyeing synthetic or semi-synthetic, or natural materials. 4,089,648, Cl. 8-39.00R.

Oishi, Yasushi; Horiuchi, Hideo; Goto, Toshio; and Hamada, Yoichi, to Fuji Photo Film Co., Ltd. Self-developing camera and film pack therefore. 4,090,211, Cl. 354-86.000.

Okabe, Katsuhiko; and Sudo, Yoshiyuki, to Copal Company Limited. Impact printer. 4,089,263, Cl. 101-93.330.

Okada, Akira, to National Research Institute for Metals. Method for controlling the shape of a molten pool in gas shield arc welding. 4,090,057, Cl. 219-122.000.

Okamoto, Tomiyasu; Nishimoto, Tsunanori; Sawada, Kaoru; Hayakawa, Koji; and Kurihara, Tomomichi, to Hitachi Shipbuilding & Engineering Co., Ltd. Secondary barrier construction for vessels carrying spherical low temperature liquified gas storage tanks. 4,089,285, Cl. 114-74.00A.

Okaya, Akira, to Parmelee, G. Kendall. Connector method and apparatus for coupling two systems together while excluding the environment from the system interiors. 4,089,341, Cl. 137-68.00R.

Okubo, Kanichi: *See*—
Kinase, Takeo; Yano, Isamu; Okubo, Kanichi; Kitakoga, Hidetoshi; and Tayama, Hiromitsu, 4,089,178, Cl. 61-1.00F.

Okuda, Itsuki: *See*—
Sugiyama, Hironari; Chiyomaru, Isao; Okuda, Itsuki; Yamamoto, Hisaaki; and Ito, Hideo, 4,089,964, Cl. 424-270.000.

Okumura, Masahide; Sakitani, Yoshio; and Ueno, Yukichi, to Hitachi, Ltd. Field emision electron gun with controlled power supply. 4,090,106, Cl. 315-107.000.

Oleck, Stephen M.; Sherry, Howard S.; Fischer, Ronald H.; and Milstein, Donald, to Mobil Oil Corporation. Process for demetalation and desulfurization of petroleum oils. 4,089,774, Cl. 208-89.000.

Olin Corporation: *See*—
Waxelbaum, Paul M.; and Huston, Duane A., 4,089,935, Cl. 423-474.000.
Wojtowicz, John A., 4,090,023, Cl. 544-190.000.

Olin, George R.: *See*—
Saeva, Franklin D.; Olin, George R.; and Limburg, William W., 4,089,684, Cl. 96-1.100.

Olofsson, Gosta. Heat engine for transforming heat energy to work including ejector heat pump. 4,089,177, Cl. 60-688.000.

Olson, James R.: *See*—
Siegel, Harris T.; and Olson, James R., 4,089,472, Cl. 241-5.000.

Olsson, Lars-Uno Verner. Scaffold. 4,089,389, Cl. 182-178.000.

Olving, Henrik C. Pivoting ball game board with gimbal control. 4,089,526, Cl. 273-110.000.

Olympus Optical Co., Ltd.: *See*—
Ichikawa, Hiroki; and Kobayashi, Masao, 4,089,487, Cl. 242-186.000.
Sato, Masaaki, 4,090,224, Cl. 360-60.000.

O'Meara, Thomas R., to Hughes Aircraft Company. Polarization reference imaging system. 4,090,066, Cl. 250-199.000.

Ondrasik, Vladimir J., II. Constraining grate. 4,089,321, Cl. 126-215.000.

O'Neill, Daniel Edward: *See*—
Harmke, Charles Raymond; and O'Neill, Daniel Edward, 4,089,422, Cl. 209-137.000.

Ono, Takezo, to Nippon Evr Limited. Method for regenerating waste developers used for processing silver halide photographic materials and method for storing developers. 4,089,760, Cl. 204-109.000.

Orgill, Rodney H.: *See*—
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,090,236, Cl. 364-200.

Ormrod, George T. W.: *See*—
De Villiers, Johan P. R.; and Ormrod, George T. W., 4,090,073, Cl. 250-273.000.

Orosz, Miklos J.: *See*—
Fuller, Frederick B.; Orosz, Miklos J.; Williams, Richard H., Jr.; and Diimmler, Glen F., 4,090,230, Cl. 361-345.000.

Ortho Pharmaceutical Corporation: *See*—
Kane, Vinayak V., 4,089,876, Cl. 260-327.00M.

Osaka, Susumu: *See*—
Toda, Minoru; and Osaka, Susumu, 4,090,153, Cl. 333-30.00R.

Osborne, Arnie. Baby carriage. 4,089,543, Cl. 280-647.000.

Osborne, Edward L., to Westvaco Corporation. Flap lock bulk bin. 4,089,417, Cl. 206-600.000.

Ostrowski, Piotr, to Girling Limited. Self-energizing disc brakes and actuator therefor. 4,089,392, Cl. 188-71.400.

OTISCA Industries, Ltd.: *See*—
Smith, Clay D.; and Keller, Douglas V., Jr., 4,089,340, Cl. 137-13.000.

Otto Bock Orthopadische Industrie K.G.: *See*—
Glabiszewski, Richard, 4,089,072, Cl. 3-30.000.

Oughton, Richard Walton: *See*—
Bell, Albert; Boocock, John Roger Brooke; and Oughton, Richard Walton, 4,089,848, Cl. 260-112.00R.

Oulton, David B., to Pylon Electronic Development Company, Ltd. Electronic hybrid circuit. 4,090,043, Cl. 179-170.0NC.

Overmyer, Richard C.; and Guerra, Mario, to Francesville Drain Tile Corporation. Filter sleeve stuffing machine. 4,089,108, Cl. 29-820.000.
Overmyer, Robert C.; and Nijhawan, Pramodh, to Hawley Manufacturing Corporation. Furnace hood with integral conveyor feeding. 4,089,640, Cl. 432-73.000.
Owens-Corning Fiberglas Corporation: *See—*
Houston, Robert L., 4,090,241, Cl. 364-473.000.
Owens-Illinois, Inc.: *See—*
Byrum, Bernard W., Jr., 4,090,100, Cl. 313-220.000.
Franks, Nelson J.; Gray, Thomas W.; and Whitney, Ralph H., 4,089,208, Cl. 73-45.500.
Ryan, William H.; and Johnson, William E., 4,090,109, Cl. 315-169.0TV.
Oxy Metal Industries Corporation: *See—*
Tremmel, Robert Arnold; and Herr, Roy Wilbur, 4,089,754, Cl. 204-43.00T.
Oy Hartwall AB: *See—*
Sundman, Gunnar Bernhard, 4,089,420, Cl. 209-80.000.
Oy Nokia AB: *See—*
Valtonen, Rainer Ilkka Tapio, 4,089,578, Cl. 339-21.00R.
Ozbey, Ahmet; Ozbey, Amber L.; and Ozbey, Suzan N. Platform exercise apparatus with spring tensioned arm and leg exercise assemblies. 4,089,520, Cl. 272-136.000.
Ozbey, Amber L.: *See—*
Ozbey, Ahmet; Ozbey, Amber L.; and Ozbey, Suzan N., 4,089,520, Cl. 272-136.000.
Ozbey, Suzan N.: *See—*
Ozbey, Ahmet; Ozbey, Amber L.; and Ozbey, Suzan N., 4,089,520, Cl. 272-136.000.
Paal, Gabor; and Schackert, Klaus, to International Business Machines Corporation. Method of passivating and planarizing a metallization pattern. 4,089,766, Cl. 204-192.00D.
Pace Incorporated: *See—*
Young, Loring E.; and Siegel, William J., 4,089,619, Cl. 417-54.000.
Pacific Handy Cutter, Inc.: *See—*
Richards, James L., 4,089,112, Cl. 30-162.000.
Pacini, Elmo J.: *See—*
Wingate, Sidney A.; and Pacini, Elmo J., 4,089,200, Cl. 72-389.000.
Pack, Charles L. Load supporting and moving portable roller skid. 4,089,271, Cl. 104-134.000.
Packer, Herbert: *See—*
Swinehart, Carl F.; and Packer, Herbert, 4,089,937, Cl. 423-490.000.
Padgitt, Kenneth Warren, to Motorola, Inc. Adjustable rotary position sensor for electronic spark timing control. 4,089,316, Cl. 123-146.50A.
Page, Roger A.: *See—*
Spenceley, Gene D.; Baker, Robert; and Page, Roger A., 4,089,677, Cl. 75-51.000.
Palazzolo, Michele. Pro-skill basketball game. 4,089,525, Cl. 273-101.000.
Pallos, Ferenc M.: *See—*
Arneklev, Duane R.; Pallos, Ferenc M.; and Gaughan, Edmund J., 4,089,673, Cl. 71-93.000.
Palmer, Dale A., to Monroe Auto Equipment Company. Vehicle suspension device. 4,089,511, Cl. 267-8.00R.
Pantzer, Rudiger; and Ruf, Josef, to BASF Farben & Fasern AG. Corrosion inhibiting coatings for steel. 4,089,690, Cl. 106-14.230.
Papalos, John George, to Diamond Shamrock Corporation. Sulfonated alkylphenoxy 2 to 5-carbon-atom alkanoic acids and salts. 4,089,894, Cl. 260-507.00R.
Pardo, Pierre; and Pruvot, Francois C., to Sofermo. Modular robot having an adaptable configuration. 4,089,427, Cl. 214-1.0CM.
Parent, Edward D.: *See—*
Jerabek, Charles F.; Parent, Edward D.; and Smith, Harold W., 4,089,643, Cl. 432-262.000.
Parke, Fred F.: *See—*
Kleespies, Richard M.; and Parke, Fred F., 4,089,610, Cl. 403-1.000.
Parmelee, G. Kendall: *See—*
Okaya, Akira, 4,089,341, Cl. 137-68.00R.
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Partenheimer, Walter, to Standard Oil Company (Indiana). Reactivation of a phosphorus-vanadium-oxygen complex oxidation catalyst. 4,089,807, Cl. 252-415.000.
Pass, Reinhard: *See—*
Naskar, Sasanka Sekhar; Renckhoff, Gustav; Heers, Wolfgang; and Pass, Reinhard, 4,089,879, Cl. 260-410.700.
Patel, Jay, to Rotron Incorporated. Fan with noise reduction. 4,089,618, Cl. 416-228.000.
Patel, Kishor J.; and Carlson, Allen J., to Applied Power, Inc. Proportional force amplifier. 4,089,252, Cl. 91-49.000.
Patience, Donald: *See—*
Hartigan, Edward G.; and Patience, Donald, 4,089,331, Cl. 128-132.00D.
Patterson, John F.; and Galbraith, Kirk P., to Exxon Research & Engineering Co. Mixing vane grid spacer. 4,089,741, Cl. 176-87.000.
Patterson, Ward W., Jr., to Stout Industries, Inc. Sign suspension device. 4,089,129, Cl. 40-606.000.
Patton, Jesse C., to Bendix Corporation, The. Accessory for gas concentrator-gas chromatograph analyzer. 4,089,207, Cl. 73-23.100.
Patty, Richard L. Emergency position-fixing device. 4,090,185, Cl. 340-321.000.
Paul, Franklin O. Solid waste disposal. 4,089,277, Cl. 110-204.000.
Paulonis, Daniel F.: *See—*
Toppen, Harvey R.; Loersch, Joseph F.; Paulonis, Daniel F.; and Lowrey, O. Preston, Jr., 4,089,456, Cl. 228-195.000.
Paulson, Allen E. Aircraft with combination power plant. 4,089,493, Cl. 244-135.00R.
Paulus, Rudolf: *See—*
Pfeifer, Josef; Paulus, Rudolf; Gutmann, Walter; and Resch, Michael, 4,090,206, Cl. 346-107.00R.
Payoux, Daniel, to Regie Nationale des Usines Renault. Device for binding an engine to a vehicle chassis or body. 4,089,385, Cl. 180-64.00R.
Pearce, Daniel Scott, to GTE Sylvania Incorporated. Clipping indicator circuit for transistor amplifier. 4,090,146, Cl. 330-2.000.
Pechard, Lucien Leon; and Logerot, Bernard Andre, to Bunker Ramo Corporation. Distributing device for a multiconductor cable. 4,089,577, Cl. 339-18.00P.
Peddle, Charles: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,090,236, Cl. 364-200.
Pedersen, August Bartold. Detection of water in oil. 4,089,652, Cl. 23-230.0HC.
Peekna, Andres, to United States of America, Army. Brinell sandwich transducer. 4,089,212, Cl. 73-94.000.
Pelletier, Robert, to Societe d'Exploitation des Etablissements H. Pelletier. Pallet lock. 4,089,275, Cl. 105-465.000.
Pennell, Anthony Robin, to Associated Portland Cement Manufacturers Limited, The. Manufacture of Portland cement. 4,089,697, Cl. 106-100.000.
Pennsylvania Steel Corporation: *See—*
Zecman, Kenneth, 4,089,679, Cl. 75-126.00C.
Pepelnik, Rudolf: *See—*
Michaelis, Walfried; Muller, Agmar; Fanger, Hans Ulrich; and Pepelnik, Rudolf, 4,090,072, Cl. 250-255.000.
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Perkins, Charles H., to Robertshaw Controls Company. Temperature telemetry for a settable cooking probe. 4,089,222, Cl. 73-352.000.
Peroni, Peter A.: *See—*
Teti, Joseph A., Jr.; and Peroni, Peter A., 4,089,464, Cl. 220-4.00A.
Perreira, Walter. Quick-release gas cap latch retainer device. 4,089,551, Cl. 292-260.000.
Pessier, Rudolf Carl Otto, to Hughes Tool Company. Cutter mounting for a large hole earth boring bit. 4,089,382, Cl. 175-361.000.
Peterson, Donald E.: *See—*
Haupt, Robert C.; and Peterson, Donald E., 4,089,394, Cl. 192-4.00A.
Petitpierre, Jean Claude, to CIBA-GEIGY Corporation. Pressure-sensitive and/or heat-sensitive recording material. 4,089,546, Cl. 282-27.500.
Petrocci, Alfonso N.: *See—*
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,089,977, Cl. 424-329.000.
Petrolite Corporation: *See—*
Bessler, Donald U., 4,089,803, Cl. 252-344.000.
Redmore, Derek, 4,089,650, Cl. 21-2.70A.
Pettibone Corporation: *See—*
Brown, Wilburn Kelly, 4,089,621, Cl. 417-118.000.
Pfeifer, Josef; Paulus, Rudolf; Gutmann, Walter; and Resch, Michael, to Agfa-Gevaert AG. Method and apparatus for producing successive lines of image points on a recording medium. 4,090,206, Cl. 346-107.00R.
Pfister, Rudolf: *See—*
Binder, Dieter; Hromatka, Otto; Pfister, Rudolf; and Zeller, Paul, 4,090,020, Cl. 544-48.000.
Pfizenmaier, Wolfgang: *See—*
Jeschke, Willi; and Pfizenmaier, Wolfgang, 4,089,264, Cl. 101-365.000.
Pfizer Inc.: *See—*
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Phillips, Alvin Carson; and Cumbach, James Stephen, to Phillips Control Corp. Energy demand controller and method therefor. 4,090,062, Cl. 219-486.000.
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Phillips Petroleum Company: *See—*
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Phillips, William H., to Trippensee Corporation. Apparatus for separably coupling a sample container to a sample gathering device. 4,089,131, Cl. 43-4.000.
Picard, Jacques; Saunier, Marc; and Tranchant, Jean L., to Societe Nationale des Poudres et Explosifs. Screw extruder. 4,089,510, Cl. 366-83.000.
Picas, Arturo: *See—*
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Pierlot, Michel, to Societe Industrielle de Brevets et d'Etudes S.I.B.E. Carburation devices. 4,089,308, Cl. 123-119.00R.

Pierson, Robert B., to Tapecon, Inc. Recording tape applicator. 4,090,003, Cl. 428-42.000.

Pilon, Harlan J.: *See—*
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Plaxico, Robert E.: *See—*
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Plunkett, Allan Barr: *See—*
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Plunkett, Bradley J., to United Recording Electronic Industries. Automatic frequency response plotting system. 4,090,142, Cl. 328-132.000.

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Fitzgerald, Maurice J., 4,089,688, Cl. 96-114.000.

Polczynski, Christopher E., to Northrop Corporation. Multiple station multiplexed communications link employing a single optical fiber. 4,089,584, Cl. 350-96.160.

Poletto, John Frank: *See—*
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Polinski, Leon M.; Roberts, George W.; and Hindin, Saul G., to Engelhard Minerals & Chemicals Corporation. Catalyst system. 4,089,654, Cl. 23-288.0FC.

Polsky, Jury Mikhailovich; Zakharov, Valentin Petrovich; Golets, Nikolai Trofimovich; Tayakin, Jury Vasilievich; Lipovetsky, Gennady Petrovich; Protsenko, Valery Vasilievich; Khomenko, Alexandr Dmitrievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich. Sequential computing system. 4,090,246, Cl. 364-736.000.

Polypac B.A.L. Limited: *See—*
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Porter, Wellington W. Method and structure for automatically separating unwanted materials from machine harvested tomatoes. 4,089,421, Cl. 209-97.000.

Porvair Limited: *See—*
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Posnansky, Mario. Method and apparatus for converting radiant solar energy into mechanical energy. 4,089,174, Cl. 60-641.000.

Post Office: *See—*
Ferro, Berkeley Michael; Spratling, Rodney Edwin; and Walker, Aubrey Douglas, 4,089,995, Cl. 427-157.000.

Posta, John J., Jr.: *See—*
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Poticha, Charles; and Laird, Andrew K. Frequency marker generator. 4,090,126, Cl. 324-57.0SS.

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Power Systems Development Corp.: *See—*
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Powers Regulator Company: *See—*
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PPG Industries, Inc.: *See—*
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Schimmel, Karl F.; and Wismer, Marco, 4,089,846, Cl. 260-78.0TF.
Temple, Rodger G., 4,089,800, Cl. 252-316.000.

Pralutsky, James J. Splash shield. 4,089,537, Cl. 280-154.50R.

Prange, Bernard H.; and Fignar, Gerald P. Vehicle seat. 4,089,559, Cl. 297-201.000.

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Presset, Rene; and Torregrosa, Michel, to Crouzet. Temperature sensing device for producing alternating electric signals whose period is a function of a temperature. 4,090,151, Cl. 331-66.000.

Preston, Peter Joseph; Roberts, George Leathwhite, Jr.; Filimore, Dennis Arthur; and Sheehan, Gerard Martin, to American Cyanamid Company. Combination beneficiation ilmenite digestion liquor reduction process. 4,089,675, Cl. 75-1.00T.

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Brinkman, Richard Edward; and Vogenthaler, Robert Loren, 4,089,945, Cl. 424-164.000.
Chutter, Raymond Allen; Green, Paul James; Hofmann, Robert Lee; and Long, Daniel Rose, 4,089,437, Cl. 222-94.000.
Evans, Stephen F., 4,089,149, Cl. 53-24.000.

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Pruvot, Francois C.: *See—*
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Pylon Electronic Development Company, Ltd.: *See—*
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Hood, Larry L., 4,089,983, Cl. 426-250.000.
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Quick, Donald J., to Massey-Ferguson Services N.V. Clutches. 4,089,396, Cl. 192-56.00F.

Quick Point Pencil Co., Inc.: *See—*
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Quintanar, Roberto; Quintanar, Sergio; Quintanar, Alexandro; and Matthews, Delbert K. Film transport mechanism. 4,089,490, Cl. 242-181.000.

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Raffel, Reiner; Althausen, Ferdinand; Knipp, Ulrich; Krippl, Kurt; Fohr, Wolfgang; and Schwesig, Helmut, to Maschinenfabrik Hennecke GmbH; and Bayer Aktiengesellschaft. Method and apparatus for measuring the proportion of undissolved gas in a liquid component for the production of foam materials. 4,089,206, Cl. 73-19.000.

Raghu, Sivaraman; Hoffmann, Arthur Kentaro; and Singh, Balwant, to American Cyanamid Company. Intermediates for synthesis of tetramisole, levamisole and their derivatives. 4,090,025, Cl. 548-320.000.

Rahav, Amir; and Raz, Mathy, to Tedea Technological Development and Automation Ltd. Guided-beam transducers. 4,089,217, Cl. 73-141.00A.

Raidel, John E. Axle suspension. 4,089,544, Cl. 280-709.000.

Rambauske, Werner R., to Raytheon Company. Optical interferometer. 4,089,607, Cl. 356-109.000.

Ramer, James L. Method for treating sewage. 4,089,761, Cl. 204-149.000.

Ramey, Chester E.; and Luzzi, John J., to Ciba-Geigy Corporation. Hindered piperidine carboxylic acids, metal salts thereof and stabilized compositions. 4,089,842, Cl. 260-45.75C.

Ramshaw, Jack: *See—*
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Rapoport, Henry; and Snyder, Clinton D., to University of California,

The Regents of the. Preparation of menaquinones. 4,089,873, Cl. 260-396.00K.
Raptis, Constantine. Silent dent puller. 4,089,201, Cl. 72-390.000.
Rasco, Darius K. Shaving means. 4,089,110, Cl. 30-41.500.
Ratliff, Frank W.; and McBurnett, James R., to Tyrone Hydraulics, Inc. Automatic pump control system. 4,089,166, Cl. 60-421.000.
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Ray, James A., to Martin Marietta Corporation. Hydraulic cement mixes and process for improving hydraulic cement mixes. 4,089,695, Cl. 106-89.000.
Ray, James A., to Martin Marietta Corporation. Hydraulic cement mixes and process for improving hydraulic cement mixes. 4,089,696, Cl. 106-90.000.
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Herrmann, Eric Peter, 4,090,095, Cl. 307-221.00D.
Hoover, Merle Vincent, 4,090,139, Cl. 325-451.000.
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Reed, Robert D.; and McGill, Eugene C., to John Zink Company. Fuel-water vapor premix for low NOx burning. 4,089,639, Cl. 431-211.000.
Rees, John Michael; Horler, Christopher Arthur; and Downing, Anthony Peter, to Thorn Electrical Industries Limited; and Imperial Chemical Industries Limited. Manufacture of electric lamps. 4,090,101, Cl. 313-223.000.
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Roth, Peter C. Cigarette flicker. 4,089,338, Cl. 131-237.000.
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Rubin, William L.: *See—*
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Rudolph, Paul: *See—*
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Russell, James T., to Jacobs, Eli S. Multi-layered opitcal data records and playback apparatus. 4,090,031, Cl. 358-130.000.
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Ryan, William H.; and Johnson, William E., to Owens-Illinois, Inc. Gas discharge coupling of driving circuitry to a gas discharge display/memory panel. 4,090,109, Cl. 315-169.0TV.
Rys, Tadeusz J., to Gould Inc. Operating handle means for stacked circuit breaker modules. 4,090,157, Cl. 335-8.000.
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Saito, Hideo; Fukamichi, Kazuaki; Saito, Yoshinobu; and Sugimoto, Sakae, to Research Institute for Iron, Steel and Other Metals of the Tohoku University, The. Antiferromagnetic chromium base invar-type alloys and a method of producing the same. 4,089,711, Cl. 148-11.50R.
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Sakata, Shigeyoshi, to Minolta Camera Kabushiki Kaisha. Zoom lens barrel having macro-photographing mechanism. 4,089,590, Cl. 350-187.000.
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Salgo, Francis John. Mobile ion film memory. 4,090,253, Cl. 365-128.000.
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Sandoz, Inc.: *See—*
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Sandoz Ltd.: *See—*
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Sanford, Arthur Carol. Apparatus for fabricating flat trusses. 4,089,107, Cl. 29-798.000.
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Sano, Takezo; Kobayashi, Akira; and Murase, Ichiki, to Sumitomo Chemical Company, Limited. Cation exchanger. 4,089,816, Cl. 260-2.20R.
Sanson, Joseph F., to Upjohn Company, The. The Method of reshaping resiliently deformable sheet material for integration with a flexible plastic foam as a cover therefor. 4,089,919, Cl. 264-46.600.
Sansone, Frank Peter: *See—*
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Sasamoto, Asao; and Amano, Hideaki, to Hitachi, Ltd. Magnetic disc apparatus. 4,090,117, Cl. 318-365.000.
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Sato, Masaaki, to Olympus Optical Co., Ltd. Apparatus for preventing inadvertent erasure of cassette tape. 4,090,224, Cl. 360-60.000.
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Sattinger, Stanley S., to United States of America, Energy. Dual-shank attachment design for omega seals. 4,089,535, Cl. 277-236.000.
Sauder, Kenneth D. Movable boat propulsion apparatus. 4,089,289, Cl. 115-41.0HT.
Sauder, Myrl D., to Sauder Woodworking Co. Method of making a laminate. 4,089,721, Cl. 156-212.000.
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Saunders, John Christopher: *See*—
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Sawyer, Willard C., to Gorham International Inc. Method and apparatus for controlling a wet end drum of a steam heated drum dryer. 4,089,121, Cl. 34-16.000.
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Scharting, Gunter: *See*—
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Schaumann, Anton; and Weber, Willi. Spring contact switch assembly. 4,090,053, Cl. 200-241.000.
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Scheibler, Hermann; Ruchlak, Kasimir; Heinze, Christoph; and Wolff, Horst, to Hoechst Aktiengesellschaft. Process and apparatus for polymerizing α-ethylenically unsaturated monomers in aqueous media. 4,090,014, Cl. 526-62.000.
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Scherzinger, Werner: *See*—
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Schill, Tage. Catch apparatus for a loading carriage on an inclined drift elevator. 4,089,391, Cl. 187-12.000.
Schimmel, Karl F.; and Wismer, Marco, to PPG Industries, Inc. Polysalts of acid-ester compounds with hydrazine or hydrazides and method of preparing heterocyclic polymers from said polysalts. 4,089,846, Cl. 260-78.0TF.
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Schmolka, Irving R., to BASF Wyandotte Corporation. Roll-on perfume composition. 4,089,814, Cl. 252-522.000.
Schneider, Axel, to Scheibler Peltzer & Co. Take-up frame for pile fabric. 4,089,484, Cl. 242-77.100.
Schneider, Fritz W.; and Grgic, Ivica, to Elastogran Maschinenbau GmbH & Co. Mixing and proportioning apparatus for multi-component plastics materials. 4,090,262, Cl. 366-155.000.
Schneider, Michel, to Battelle Memorial Institute. Process for the preparation of liposomes. 4,089,801, Cl. 252-316.000.
Schneider, Peter; and Bickel, Hans, to Ciba-Geigy Corporation. 7-β-[D-2-Amino-2-(1,4-cyclohexadienyl)-acetylamino]-3-Hal-3-cephem-4-carboxylic acids. 4,089,955, Cl. 424-246.000.
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Schwindt, Gary William, to Litton Systems, Inc. Printed circuit board connector. 4,089,581, Cl. 339-176.0MP.
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Scott, James E., to Nalco Chemical Company. Pyrophosphate-zinc corrosion inhibitor. 4,089,651, Cl. 21-2.70R.
Scott, Thaddeus Leroy. Segmented printout device. 4,089,401, Cl. 400-125.100.
Scott, William R.; and Carlyle, John M., to United States of America, Navy. Acoustic emission fatigue analyzer. 4,089,224, Cl. 73-587.000.
Sebald, Walter, to Gebr. Marklin & Cie. GmbH. Automobile mirror. 4,089,233, Cl. 74-424.80A.
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Seib, James N. Electric circuit control system using logic device. 4,090,107, Cl. 315-156.000.
Seidel, Harold, to Bell Telephone Laboratories, Incorporated. Interferometric amplifier. 4,090,147, Cl. 330-10.000.
Seidler, Jack, to North American Specialties Corp. Method for producing electrical contacts. 4,089,106, Cl. 29-630.00C.
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Shaffer, Robert J.; and Schwering, Vernon J., to Republic Steel Corporation. Method of improving corrosion resistance of lead and lead alloy coated metal. 4,089,707, Cl. 148-6.14R.
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Segawa, Takashi, 4,089,231, Cl. 74-217.00B.
Shimiya, Keiji; Miura, Norio; Takano, Masao; and Ishigaki, Kunio, to Dai Nippon Toryo Co., Ltd.; and Fuji Photo Film Co., Ltd. Intensifying screen for radiographs. 4,090,085, Cl. 250-483.000.
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Shimizu, Toshihide: *See—*
Koyanagi, Shunichi; Hasegawa, Niichiro; Shimizu, Toshihide; Kaneko, Ichiro; and Katsushima, Sensaku, 4,090,015, Cl. 526-62.000.
Shimura, Kazuo: *See—*
Mori, Yoshihisa; and Shimura, Kazuo, 4,090,039, Cl. 179-100.41D.
Shin-Etsu Chemical Co.: *See—*
Shinohara, Toshio; Arai, Masatoshi; and Kojima, Kenichi, 4,089,884, Cl. 260-448.20N.
Shin-Etsu Chemical Co., Ltd.: *See—*
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Shore, Samuel: *See—*
Muzyczko, Thaddeus M.; Shore, Samuel; and Martin, Jerome A., 4,089,789, Cl. 252-8.55E.
Shrimpton, Brian Clifford: *See—*
Mostyn, William Max; Verrall, Roger Percy; and Shrimpton, Brian Clifford, 4,089,988, Cl. 426-578.000.
Shterenberg, Ljudmila Efimovna: *See—*
Vereschagin, Leonid Fedorovich; Yakovlev, Evgeny Nikolaevich; Varfolomeeva, Tatyana Dmitrievna; Preobrazhensky, Alexandr Yakovlevich; Slesarev, Vladislav Nikolaevich; Stepanov, Vasily Alexandrovich; and Shterenberg, Ljudmila Efimovna, 4,089,933, Cl. 423-446.000.
Shughart, Mervin Leonard: *See—*
Loomis, Phillip Eugene; Hammond, James Woodrow; and Shughart, Mervin Leonard, 4,089,405, Cl. 198-475.000.
Shuster, Edward J.: *See—*
Light, Kenneth K.; Vock, Manfred Hugo; Shuster, Edward J.; and Schmitt, Frederick Louis, 4,089,986, Cl. 426-538.000.
Shuttleworth, Anthony Ernest, to General Electric Company Limited, The. Electric puke code modulation encoding arrangements. 4,090,192, Cl. 340-347.0NT.
Sibbitt, Wilmer L., Jr.: *See—*
Elliott, Guy R. B.; Holley, Charles E.; Houseman, Barton L.; and Sibbitt, Wilmer L., Jr., 4,090,012, Cl. 429-20.000.
Sibley, Henry C., to General Signal Corporation. Vital digital communication system. 4,090,173, Cl. 340-146.1BA.
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Keen, Everett M.; and Siciliano, Anthony J., 4,089,300, Cl. 119-52.0AF.
Sidorenko, Vladimir Pavlovich: *See—*
Polsky, Jury Mikhailovich; Zakharov, Valentin Petrovich; Golets, Nikolai Trofimovich; Tayakin, Jury Vasilievich; Lipovetsky, Gennady Petrovich; Protsenko, Valery Vasilievich; Khomenko, Alexandr Dmitrievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich, 4,090,246, Cl. 364-736.000.
Siegel, Harris T.; and Olson, James R., to Eastman Kodak Company. Impact target for fluid energy mills. 4,089,472, Cl. 241-5.000.
Siegel, William J.: *See—*
Young, Loring E.; and Siegel, William J., 4,089,619, Cl. 417-54.000.
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Hofen, Willi; Schreyer, Gerd; Wirthwein, Rolf; Waldmann, Helmut; and Siekmann, Gerd, 4,089,892, Cl. 260-502.00R.
Siemens Aktiengesellschaft: *See—*
Anger, Klaus, 4,090,077, Cl. 250-311.000.
Auracher, Franz; and Kersten, Ralf, 4,089,583, Cl. 350-96.150.
Grassmann, Peter, 4,090,079, Cl. 250-360.000.
Jenik, Franz; and Wentzel, Peter, 4,090,144, Cl. 328-150.000.
Krause, Gerhard, 4,090,149, Cl. 330-293.000.
Leypold, Dieter; Vachenauer, Erwin; and v. Pieverling, Klaus, 4,090,200, Cl. 343-106.00R.
Mahlein, Hans; and Winzer, Gerhard, 4,089,582, Cl. 350-96.130.
Sussmann, Erhard, 4,089,735, Cl. 156-612.000.
Thiele, Gerd; and Schraudolph, Manfred, 4,090,233, Cl. 363-68.000.
Vachenauer, Erwin, 4,090,150, Cl. 330-302.000.
Widmann, Dietrich; and Binder, Johann, 4,090,068, Cl. 250-201.000.
Siemonsen, Frederik A., to Reynolds Metals Company. Ball bat and method of making the same. 4,089,199, Cl. 72-370.000.
Siiberg, Hemming G., to Wagner Electric Corporation. Electromechanical liquid level sensor. 4,090,050, Cl. 200-84.00C.
Silverstein, Milton M., to J.M.J. Electronics, Inc. Miniature portable public address system. 4,090,033, Cl. 179-1.0AT.
Silvestri, Giovanni J., to United States of America, Navy. Accommodating device for thermal transient expansions. 4,089,162, Cl. 123-200.000.

Silvey, Gene A.: *See—*
Doo, Ven Y.; Nichols, Donald R.; and Silvey, Gene A., 4,089,992, Cl. 427-94.000.

Simmons, Gerald P.; Brubaker, Hiram A.; Streight, William E.; and Brown, Robert W., to Caterpillar Tractor Co. Mounting arrangement for right angle cassegranian telescope reflector system. 4,089,595, Cl. 350-294.000.

Simms Group Research & Development Limited: *See—*
Seilly, Alec Harry, 4,090,097, Cl. 310-27.000.

Simon, Piroska: *See—*
Meszaros, Zoltan; Knoll, Jozsef; Hermecz, Istvan; Simon, Piroska; Szentmiklosy, Peter; Vasvari, Lelle; Horvath, Agnes; Horvath, Gabor; and Dvortsak, Peter, 4,089,858, Cl. 260-295.00R.

Simpson, Ronald O.; Starling, J. David; James, Bobby D.; Godin, Thomas John; Ginsberg, Guenter; and Drbal, Vladimir J., to Coulter Electronics, Inc. Aperture module for use in particle testing apparatus. 4,090,128, Cl. 324-71.0CP.

Simpson, Verne G., to General Electric Company. Process aids for fluorosilicone polymers. 4,089,833, Cl. 260-29.15B.

Simpson, Vernon P.; and Coats, Alma L., to Hooker Chemicals & Plastics Corp. Process for dyeing polymer substrates. 4,089,645, Cl. 8-4.000.

Simroth L., Ernesto: *See—*
Macaulay, Malcolm Jack; and Simroth L., Ernesto, 4,089,777, Cl. 209-259.000.

Sims, Joseph Wade. Umbrella tip repair kit. 4,089,416, Cl. 206-582.000.

Singer Company, The: *See—*
Koester, Richard H., 4,089,450, Cl. 226-127.000.

Singh, Ajaib, to American Cyanamid Company. Method for the preparation of polythioethers from thiodiethanol using heterogeneous mixed metal oxide catalysts. 4,089,905, Cl. 260-609.00R.

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Singh, Balwant: *See—*
Raghu, Sivaraman; Hoffmann, Arthur Kentaro; and Singh, Balwant, 4,090,025, Cl. 548-320.000.

Sinobad, Dusan, to Compagnie Industrielle des Telecommunications Cit-Alcatel S.A. Digital image memory adapted to distribute image blanks. 4,090,260, Cl. 365-237.000.

Sirota, Alexandr Yakovlevich: *See—*
Polsky, Jury Mikhailovich; Zakharov, Valentin Petrovich; Golets, Nikolai Trofimovich; Tayakin, Jury Vasilievich; Lipovetsky, Gennady Petrovich; Protsenko, Valery Vasilievich; Khomenko, Alexandr Dmitrievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich, 4,090,246, Cl. 364-736.000.

Sirvio, Larry M.: *See—*
Williams, Todd R.; and Sirvio, Larry M., 4,089,897, Cl. 260-514.00D.
Williams, Todd R.; and Sirvio, Larry M., 4,090,019, Cl. 542-426.000.

Sivignon, Pierre. Portable gas lamps. 4,089,635, Cl. 431-111.000.

Sjoberg, Berndt Olof Harald: *See—*
Bamberg, Peter; Ekstrom, Bertil Ake; and Sjoberg, Berndt Olof Harald, 4,089,963, Cl. 424-270.000.

Skibbe, Martin O.: *See—*
Enkoji, Takashi; and Skibbe, Martin O., 4,089,821, Cl. 260-8.000.

Skipworth, James Ernest. Paper folding apparatus. 4,089,514, Cl. 270-94.000.

Slaughter, Raymond Jeffrey; and Andrews, Patrick Vassar, to BICC Limited. Optical guides. 4,089,585, Cl. 350-96.230.

Slesarev, Vladislav Nikolaevich: *See—*
Vereschagin, Leonid Fedorovich; Yakovlev, Evgeny Nikolaevich; Varfolomeeva, Tatyana Dmitrievna; Preobrazhensky, Alexandr Yakovlevich; Slesarev, Vladislav Nikolaevich; Stepanov, Vasily Alexandrovich; and Shterenberg, Ljudmila Efimovna, 4,089,933, Cl. 423-446.000.

Slocumb, Robert C., to Conwed Corporation. Reduced aging period for polyethylene foam. 4,089,818, Cl. 260-2.5HA.

Small, Michael Peter: *See—*
Moss, Noel Sydney; and Small, Michael Peter, 4,089,826, Cl. 260-29.2EP.

Smernoff, Ronald B., to Analytical Products, Inc. Microorganism growth process and cell. 4,089,748, Cl. 195-104.000.

Smith, Andrew W., Jr., to Westinghouse Electric Corp. Workpiece shear control. 4,090,118, Cl. 318-392.000.

Smith, Bart Alan: *See—*
Amaral, Louis; Brayman, Kenneth Wood; and Smith, Bart Alan, 4,089,742, Cl. 176-78.000.

Smith, Charlie B.: *See—*
Canty, Eugene T.; Tow, Russell P.; Spayth, Frank J.; Morrow, Richard A.; and Smith, Charlie B., 4,090,198, Cl. 343-18.00D.

Smith, Clay D.; and Keller, Douglas V., Jr., to OTISCA Industries, Ltd. Viscosity modification of hydrocarbonaceous materials. 4,089,340, Cl. 137-13.000.

Smith, Derek Reginald: *See—*
Worgan, Gordon Peter; and Smith, Derek Reginald, 4,089,190, Cl. 64-1.00S.

Smith, Donald Arthur; and Horan, David Joseph, to Combustion Engineering, Inc. Control of air flow in a burner for a tangentially fired boiler. 4,089,637, Cl. 431-183.000.

Smith, Harold W.: *See—*
Jerabek, Charles F.; Parent, Edward D.; and Smith, Harold W., 4,089,643, Cl. 432-262.000.

Smith International, Inc.: *See—*
Berry, Robert W., Jr., 4,089,100, Cl. 29-428.000.

Smith Kline & French Laboratories Limited: *See—*
Durant, Graham John; Ganellin, Charon Robin; and White, George Raymond, 4,090,026, Cl. 548-342.000.

Smith, Lawrence A., Jr., to Denka Chemical Corporation. Process for recovering high purity cis-1,4-dichlorobutene-2. 4,089,751, Cl. 203-74.000.

Smith, Richard E.: *See—*
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,089,515, Cl. 271-3.000.

Smith, Robert R.: *See—*
Miller, Howard A.; Smith, Robert R.; and Nichols, Charles S., 4,090,168, Cl. 340-3.00T.

SmithKline Corporation: *See—*
Beg, Mirza M. A., 4,089,970, Cl. 424-275.000.
Buckley, Thomas Francis; and Gleason, John Gerald, 4,089,956, Cl. 424-248.530.
Kaiser, Carl; and Lafferty, John Joseph, 4,089,961, Cl. 424-267.000.

Snyder, Clinton D.: *See—*
Rapoport, Henry; and Snyder, Clinton D., 4,089,873, Cl. 260-396.00K.

Societa' Farmaceutici Italia S.p.A.: *See—*
Bernardi, Luigi; Elli, Carlo; Falconi, Giovanni; and Ferrari, Rosella, 4,089,862, Cl. 260-285.500.

Societa Italiana Telecomunicazioni Siemens S.p.A.: *See—*
Lupatin, Elio, 4,090,228, Cl. 361-86.000.

Societa Italiana Vetro SIV S.p.A.: *See—*
Comastri, Mauro; and Ciarniello, Giorgio, 4,090,202, Cl. 343-713.000.

Societe Anonyme des Etablissements Neu: *See—*
Neu, Francis, 4,089,563, Cl. 302-35.000.

Societe Anonyme dite: La Buvette: *See—*
Gustin, Jean Pierre R., 4,089,350, Cl. 138-45.00A.

Societe d'Appareillage Electrique Saparel S.A.: *See—*
Le Roux, Edouard; and Richard, Christian, 4,090,160, Cl. 335-179.000.

Societe d'Etude et de Construction d'Appareils de Precision (S.E.C.A.P.): *See—*
Martin, Claude Raymond, 4,090,063, Cl. 235-92.0AC.

Societe d'Exploitation des Etablissements H. Pelletier: *See—*
Pelletier, Robert, 4,089,275, Cl. 105-465.000.

Societe Industrielle de Brevets et d'Etudes S.I.B.E.: *See—*
Pierlot, Michel, 4,089,308, Cl. 123-119.00R.

Societe Italiana Vetro SIV SpA: *See—*
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Societe Lannionnaise d'Electronique Sle-Citerel S.A.: *See—*
Magnien, Christian; and Secher, Fernand, 4,090,136, Cl. 325-38.00B.

Societe Nationale des Poudres et Explosifs: *See—*
Picard, Jacques; Saunier, Marc; and Tranchant, Jean L., 4,089,510, Cl. 366-83.000.

Societe Nationale Elf Aquitaine (Production): *See—*
Chateau, Georges M., 4,089,377, Cl. 166-315.000.

Societe Nouvelle de Bouchons Plastiques S.N.B.P.: *See—*
Babiol, Pierre, 4,089,463, Cl. 215-329.000.

Societe Suisse pour l'Industrie Horrlogere (SSIH) Management Services S.A.: *See—*
Jeanguenin, Claude; and Jeannot, Michel, 4,089,092, Cl. 29-25.350.

Sofermo: *See—*
Pardo, Pierre; and Pruvot, Francois C., 4,089,427, Cl. 214-1.0CM.

Solid State Measurements, Inc.: *See—*
Alexander, William J., 4,090,132, Cl. 324-158.00D.

Soma, Shinichi: *See—*
Tamada, Kazumi; Mizuno, Sueo; Takase, Tadayoshi; Koumura, Masahiko; and Soma, Shinichi, 4,089,319, Cl. 126-21.00A.

Soma, Shoji; and Sato, Ikuro, to Nippon Electric Co., Ltd. System for compensating cross-polarized waves to attenuate crosstalk. 4,090,137, Cl. 325-60.000.

Sommerdijk, Johannes Leonardus; and Hoex-Strik, Francisca Maria Johanna Henrica, to U.S. Philips Corporation. Luminescent fluoride. 4,089,799, Cl. 252-301.40H.

Sony Corporation: *See—*
Mori, Yoshihisa; and Shimura, Kazuo, 4,090,039, Cl. 179-100.41D.
Ogawa, Seiichi; and Sumiya, Hiroyuki, 4,090,110, Cl. 315-368.000.
Suzuki, Masao, 4,090,111, Cl. 315-411.000.

Soper, Peter Henry Hunt; Meehan, Michael John; and Rouse, John Reginald, to Autoflow Engineering Limited. Method of forming and using a lens holder. 4,089,102, Cl. 29-527.500.

Sopora, Joachim. Apparatus for printing data on structural components. 4,089,262, Cl. 101-4.000.

Sordillo, Arthur C.: *See—*
Gring, Frank M.; and Sordillo, Arthur C., 4,089,609, Cl. 401-130.000.

Souchet, Jean-Claude: *See—*
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Sowman, Harold G.: *See—*
Lange, Roger W.; and Sowman, Harold G., 4,089,996, Cl. 427-160.000.

Sparling, James D. Ski servicing and repairing tool. 4,089,076, Cl. 7-158.000.

Spayth, Frank J.: *See—*
Canty, Eugene T.; Tow, Russell P.; Spayth, Frank J.; Morrow, Richard A.; and Smith, Charlie B., 4,090,198, Cl. 343-18.00D.

Spence-Bate, Harry Arthur Hele. Photographic film editing devices. 4,089,605, Cl. 355-77.000.
Spenceley, Gene D.; Baker, Robert; and Page, Roger A., to British Steel Corporation. Metal refining method and apparatus. 4,089,677, Cl. 75-51.000.
Speransky, Vladimir Mikhailovich: *See—*
Kamyshnikov, Arkady Ivanovich; Rutitsky, Alexandr Isaakovich; Speransky, Vladimir Mikhailovich; and Danin, Boris Konstantinovich, 4,089,532, Cl. 277-129.000.
Sperry Rand Corporation: *See—*
Bell, William W., III; Cox, Lamar; and Rubin, William L., 4,090,067, Cl. 250-199.000.
Czerner, Peter Alfred; and Marchetti, Michael John, 4,089,109, Cl. 30-34.100.
Spignese, Edward E.: *See—*
Carlson, Curtis E.; Johnson, Richard A.; and Spignese, Edward E., 4,090,250, Cl. 364-900.000.
Spiwak, John J.: *See—*
Toeniskoetter, Richard H.; and Spiwak, John J., 4,089,692, Cl. 106-38.350.
Sprague Electric Company: *See—*
Millard, Richard J.; and Poat, David R., 4,090,231, Cl. 361-433.000.
Spratling, Rodney Edwin: *See—*
Ferro, Berkeley Michael; Spratling, Rodney Edwin; and Walker, Aubrey Douglas, 4,089,995, Cl. 427-157.000.
Sprecher & Schuh Ltd. (SSA): *See—*
Vontobel, Jurg, 4,090,028, Cl. 174-14.00R.
Square D Company: *See—*
Fuller, Frederick B.; Orosz, Miklos J.; Williams, Richard H., Jr.; and Diimmler, Glen F., 4,090,230, Cl. 361-345.000.
Sta-Rite Industries, Inc.: *See—*
Houlberg, Donald M., 4,089,220, Cl. 73-194.00C.
Stahlecker, Fritz, to Stahlecker, Fritz; and Stahlecker, Hans. Open-end spinning machine with facilities and method for the simultaneous piecing of all spinning units. 4,089,155, Cl. 57-34.00R.
Stahlecker, Hans: *See—*
Stahlecker, Fritz, 4,089,155, Cl. 57-34.00R.
Stamper, David John: *See—*
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Standard Brands Incorporated: *See—*
Antrim, Richard Lee; and Harris, Donald Wayne, 4,089,745, Cl. 195-33.000.
Standard Oil Company, The: *See—*
Bremer, Noel J.; White, James F.; and Milberger, Ernest C., 4,089,870, Cl. 260-346.750.
Standard Oil Company (Indiana): *See—*
McCarthy, Edward F., 4,089,788, Cl. 252-8.55D.
Partenheimer, Walter, 4,089,807, Cl. 252-415.000.
Standard Pressed Steel Co.: *See—*
Dahl, Warren F.; and Landt, Richard C., 4,089,247, Cl. 85-70.000.
Stanfield, Willie Lonnie, Jr.: *See—*
Doolittle, Stephen Dale; Lineback, Lynn David; Sherrill, Charles Franklin; Stanfield, Willie Lonnie, Jr.; and Wildman, Kelvin Howard, 4,089,114, Cl. 30-276.000.
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., to Xerox Corporation. Document storage and transport apparatus. 4,089,515, Cl. 271-3.000.
Stanley, William L.: *See—*
Masri, Merle S.; Randall, Virginia G.; and Stanley, William L., 4,089,746, Cl. 195-63.000.
Stark, Friedrich: *See—*
Anderle, Fritz; Frey, Gerhard; Grein, Lutz; Reimpell, Uwe; and Stark, Friedrich, 4,089,505, Cl. 251-133.000.
Stark, John: *See—*
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Starling, J. David: *See—*
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Stauffer Chemical Company: *See—*
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Chang, Pei K., 4,089,987, Cl. 426-564.000.
Stedman, Robert N., to Caterpillar Tractor Co. Bucket with reduced dumping width. 4,089,431, Cl. 214-146.00R.
Steels, Gordon, to Baker Perkins Holdings Limited. Apparatus for molding confectionary having heat-dissipating nozzle. 4,089,438, Cl. 222-146.00C.
Steimann, Franz; and Nagorny, Claus, to Didier Engineering GmbH. Device for removing coke oven chamber door. 4,089,424, Cl. 212-4.000.
Steinbach, Thomas M., to TRW Inc. Ribbon connector constructions. 4,089,579, Cl. 339-91.00R.
Steinecker, Carl P., to Richardson Company, The. Acid bright zinc plating. 4,089,755, Cl. 204-55.00R.
Steinhards, Arnolds, deceased: *See—*
Kornis, Gabriel; Nidy, Eldon G.; Vostral, Henry J.; and Steinhards, Arnolds, deceased, 4,089,672, Cl. 71-92.000.
Steinke, John J., III: *See—*
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Stelzel, Werner: *See—*
Braun, Helmut; Rinno, Helmut; Reinecke, Rolf; Stelzel, Werner; and Winstel, Wolfgang, 4,089,829, Cl. 260-29.60T.
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Stephens, Charles R., Jr.: *See—*
Blackwood, Robert K.; and Stephens, Charles R., Jr., 4,089,900, Cl. 260-559.0AT.
Stephens, John A.; Benvau, Eugene H.; and Benvau, Lee R. High-strength, light-weight, fired clay body and method of producing same. 4,089,920, Cl. 264-63.000.
Sterlini, Jacques, to Compagnie Electro-Mecanique. Process for contacting a gas with a liquid. 4,089,660, Cl. 55-93.000.
Stevenson, Howard R., Jr., to General Electric Company. Inverse gain modulator. 4,090,196, Cl. 343-5.00R.
Stickle, Daniel T., deceased; and by Stickle, Hortencia Martinez, executrix. Corn flour milling. 4,089,259, Cl. 99-355.000.
Stickle, Hortencia Martinez, executrix: *See—*
Stickle, Daniel T., deceased; and Stickle, Hortencia Martinez, executrix, 4,089,259, Cl. 99-355.000.
Still, Charles D. V.: *See—*
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Stinson, Donald B., Jr.: *See—*
Banerjea, Tara N.; and Stinson, Donald B., Jr., 4,089,558, Cl. 296-137.00R.
Stobar, Leonard T., to Kimstock, Inc. Motorcycle fairing-windshield assembly. 4,089,556, Cl. 296-78.100.
Stock, Arthur J.; and Hastings, Reeve R., to Stock Equipment Company. Apparatus for introducing particulate material into a vessel. 4,089,429, Cl. 214-35.00R.
Stock Equipment Company: *See—*
Stock, Arthur J.; and Hastings, Reeve R., 4,089,429, Cl. 214-35.00R.
Stoft, Paul E.: *See—*
Cage, John M.; Shaw, Robert F.; and Stoft, Paul E., 4,089,336, Cl. 128-303.100.
Stone, Thomas G., to Evans Products Company. Bulkhead operating mechanism. 4,089,274, Cl. 105-376.000.
Storni, Angelo: *See—*
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Stott, Michael A.; and Campbell, Russell J., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Satellite communications system. 4,090,036, Cl. 179-15.0BY.
Stotz, Wolf-Gunter: *See—*
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Stout Industries, Inc.: *See—*
Patterson, Ward W., Jr., 4,089,129, Cl. 40-606.000.
Stowe, Gerald Leon. Method for making faced blocks. 4,089,925, Cl. 264-256.000.
Stowell, Susan A.: *See—*
Norman, John H.; Russell, John L., Jr.; and Stowell, Susan A., 4,089,939, Cl. 423-648.00R.
Straalsund, Jerry L., to United States of America, Energy. Flow duct for nuclear reactors. 4,089,743, Cl. 176-78.000.
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Strahman, Richard D., to Strahman Valves, Inc. Plural fluids delivery system. 4,089,470, Cl. 239-304.000.
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Strahman, Richard D., 4,089,470, Cl. 239-304.000.
Stratienko, Andrew, to Dresser Industries, Inc. Automatic releasing lock. 4,089,398, Cl. 192-114.00R.
Stratoflex, Inc.: *See—*
Vyse, Gerrard N.; and Cooke, Horise M., 4,089,549, Cl. 285-137.00R.
Streight, William E.: *See—*
Simmons, Gerald P.; Brubaker, Hiram A.; Streight, William E.; and Brown, Robert W., 4,089,595, Cl. 350-294.000.
Strunk, Richard John; Hubbard, Winchester Loomis; and Ma, Shih-Yu, to Uniroyal, Inc. Organotin sulfinates as insecticides and acaricides. 4,089,972, Cl. 424-288.000.
Sturges, James R.: *See—*
Roley, Robert D.; and Sturges, James R., 4,089,531, Cl. 277-92.000.
Suchowski, Bernard, to Hartz Mountain Corporation, The. Air-operated fish feeder. 4,089,299, Cl. 119-51.00R.
Sudo, Yoshiyuki: *See—*
Okabe, Katsuhiko; and Sudo, Yoshiyuki, 4,089,263, Cl. 101-93.330.
Suga, Gojiro, to Fuji Xerox Co., Ltd. Dot matrix converter. 4,090,188, Cl. 340-324.0AD.
Sugimoto, Sakae: *See—*
Saito, Hideo; Fukamichi, Kazuaki; Saito, Yoshinobu; and Sugimoto, Sakae, 4,089,711, Cl. 148-11.50R.

Sugioka, Taizo: *See—*
Sugiyama, Hiroshi; Yoshitake, Kuniki; Sakata, Nobuhiko; Sugioka, Taizo; and Mizuno, Nobuhisa, 4,089,798, Cl. 252-188.000.
Sugiyama, Hironari; Chiyomaru, Isao; Okuda, Itsuki; Yamamoto, Hisaaki; and Ito, Hideo, to Kumiai Chemical Industry Co., Ltd. Method of controlling fungal diseases in plants and compositions effective therefor. 4,089,964, Cl. 424-270.000.
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Sullair Schraubenkompressoren GmbH: *See—*
Hofmann, Rudolf, Jr., 4,089,623, Cl. 417-295.000.
Sullivan, Frank E., to Sullivan Systems Inc. Proces for refining fatty oils. 4,089,880, Cl. 260-424.000.
Sullivan Systems Inc.: *See—*
Sullivan, Frank E., 4,089,880, Cl. 260-424.000.
Sumitomo Bakelite Company, Limited: *See—*
Ishii, Ko; and Yoshida, Tadamasa, 4,089,726, Cl. 156-306.000.
Sumitomo Chemical Company, Limited: *See—*
Kato, Yasuyuki; Moritani, Masahiko; and Suzuki, Seiichi, 4,089,918, Cl. 264-40.700.
Miki, Tamotsu; Narisawa, Shizuo; Ichikawa, Ichiro; and Horiike, Hideki, 4,089,913, Cl. 260-880.00B.
Ohshima, Taizo; Nishikuri, Masao; Suzuki, Yasuyuki; and Yamada, Kunio, 4,089,648, Cl. 8-39.00R.
Sano, Takezo; Kobayashi, Akira; and Murase, Ichiki, 4,089,816, Cl. 260-2.20R.
Tsuji, Kozo; Fujimoto, Masanori; Masuko, Fujio; and Nagase, Tsuneyuki, 4,090,016, Cl. 536-1.000.
Sumitomo Heavy Industries, Ltd.: *See—*
Arai, Izumi; Yamada, Yasuteru; Mutsuta, Akio; Hirano, Hirotoshi; and Tuchida, Yasuzou, 4,089,507, Cl. 366-102.000.
Sumitomo Metal Industries, Ltd.: *See—*
Arai, Izumi; Yamada, Yasuteru; Mutsuta, Akio; Hirano, Hirotoshi; and Tuchida, Yasuzou, 4,089,507, Cl. 366-102.000.
Kondo, Katsuya; and Yamakawa, Tomio, 4,089,196, Cl. 72-12.000.
Sumiya, Hiroyuki: *See—*
Ogawa, Seiichi; and Sumiya, Hiroyuki, 4,090,110, Cl. 315-368.000.
Sumiyoshi, Masaharu: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,089,310, Cl. 123-119.0LR.
Sun Chemical Corporation: *See—*
Reiter, Ralph H.; and Rosen, George, 4,089,815, Cl. 260-2.00R.
Sun-Econ, Inc.: *See—*
Jonsson, Kjartan A., 4,089,667, Cl. 62-238.000.
Sun Ventures, Inc.: *See—*
Angstadt, Howard P., 4,089,907, Cl. 260-610.00B.
Hancock, Allen W., II, 4,089,752, Cl. 203-99.000.
Sundell, Olof. Method and apparatus for feeding reinforcing strand when making a tubular product. 4,089,719, Cl. 156-171.000.
Sundman, Gunnar Bernhard, to Oy Hartwall AB. Apparatus for sorting bottles and the like. 4,089,420, Cl. 209-80.000.
Sunouchi, Akio: *See—*
Hokkanji, Sakae; Shimizu, Masami; Sunouchi, Akio; Iura, Yukio; Yamamichi, Masayoshi; and Watanabe, Yoshiaki, 4,089,483, Cl. 242-71.400.
Superior Electric Company, The: *See—*
Leenhouts, Albert C., 4,090,120, Cl. 318-567.000.
Supraton F. J. Zucker KG: *See—*
Zucker, Friedrich J., 4,089,475, Cl. 241-46.060.
Surkow, Wlodzimierz: *See—*
Kulig, Stanislaw; Goral, Andrzej; Surkow, Wlodzimierz; Szczepanik, Andrzej; and Szulaczewski, Edward, 4,089,663, Cl. 55-276.000.
Sussmann, Erhard, to Siemens Aktiengesellschaft. Method for epitactic precipitation of crystalline material from a gaseous phase, particularly for semiconductors. 4,089,735, Cl. 156-612.000.
Sutton, Robert John: *See—*
Wilde, Melvyn; and Sutton, Robert John, 4,089,083, Cl. 16-82.000.
Suzuki, Katsuo, to Fuji Xerox Co., Ltd. Copy paper exhausting roller unit for use in electrophotographic copying machine. 4,089,378, Cl. 169-54.000.
Suzuki, Kazuie, to Hokushin Electric Works, Ltd. Bi-directional output electromagnetic flowmeter. 4,089,219, Cl. 73-194.0EM.
Suzuki, Kunitomo: *See—*
Higo, Moriaki; Saga, Hitoshi; Watanabe, Yoji; and Suzuki, Kunitomo, 4,089,764, Cl. 204-162.00R.
Suzuki, Masaaki: *See—*
Shirahata, Ryuji; Suzuki, Masaaki; Yamada, Yasuyuki; Kitamoto, Tatsuji; and Dezawa, Shin-ichiro, 4,089,993, Cl. 427-129.000.
Suzuki, Masao, to Sony Corporation. Malfunction detecting apparatus for use in a CRT deflection circuit. 4,090,111, Cl. 315-411.000.
Suzuki, Seiichi: *See—*
Kato, Yasuyuki; Moritani, Masahiko; and Suzuki, Seiichi, 4,089,918, Cl. 264-40.700.
Suzuki, Yasuyuki: *See—*
Ohshima, Taizo; Nishikuri, Masao; Suzuki, Yasuyuki; and Yamada, Kunio, 4,089,648, Cl. 8-39.00R.
Suzuki, Yuji: *See—*
Itoh, Yoshio; Satoh, Kakuji; Suzuki, Yuji; Miura, Yasuo; Kazama, Yoshiteru; and Yazawa, Saburo, 4,089,911, Cl. 260-859.0PV.
Svarz, Jerry J.; Kemmer, Frank N.; and Fabri, Jon O., to Nalco Chemical Company. Color removal process. 4,089,780, Cl. 210-53.000.
Svec, Frantisek: *See—*
Kalal, Jaroslav; and Svec, Frantisek, 4,089,823, Cl. 260-23.0EP.
Svecia Silkscreen Maskiner AB: *See—*
Ericsson, Sylve Jack Donald; and Larsson, Karl Georg, 4,089,123, Cl. 34-155.000.
Swallow, Roger T., to Kendall Company, The. Apparel with belt assembly. 4,089,068, Cl. 2-76.000.
Swanson, James R.; DiCesare, Sam; and Barthel, Richard C., to Powers Regulator Company. Supervisory and control system for environmental conditioning equipment. 4,090,248, Cl. 364-900.000.
Swinehart, Carl F.; and Packer, Herbert, to Harshaw Chemical Company, The. Method of making an ionic fluoride optical body with reduction of absorption bands. 4,089,937, Cl. 423-490.000.
Sycor, Inc.: *See—*
Rempel, William D., 4,089,569, Cl. 308-184.00R.
Sylvest, Karl J., to F. L. Smidth & Co. Planetary cooler system for rotary kiln plant and the like. 4,089,634, Cl. 432-80.000.
Synek, Wenzel, to FROMM AG. Apparatus for positively connecting two overlapping band portions. 4,089,352, Cl. 140-93.200.
Syntex (U.S.A.) Inc.: *See—*
Berger, Kenneth L.; Nassar, Jorge J.; and Benken, William B., 4,089,980, Cl. 426-69.000.
Edwards, John A., 4,089,865, Cl. 260-302.00H.
Muchowski, Joseph M.; and Kluge, Arthur F., 4,089,969, Cl. 424-274.000.
Szabo, Lajos: *See—*
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,089,856, Cl. 260-293.530.
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, to Richter Gedeon Vegyeszeti Gyar Rt. 1-Ethyl-1-(alkoxycarbonylethyl)-octahydro-indolo[2,3-a]quinolizines. 4,089,856, Cl. 260-293.530.
Szczepanik, Andrzej: *See—*
Kulig, Stanislaw; Goral, Andrzej; Surkow, Wlodzimierz; Szczepanik, Andrzej; and Szulaczewski, Edward, 4,089,663, Cl. 55-276.000.
Szentmiklosy, Peter: *See—*
Meszaros, Zoltan; Knoll, Jozsef; Hermecz, Istvan; Simon, Piroska; Szentmiklosy, Peter; Vasvari, Lelle; Horvath, Agnes; Horvath, Gabor; and Dvortsak, Peter, 4,089,858, Cl. 260-295.00R.
Szporny, Laszlo: *See—*
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,089,856, Cl. 260-293.530.
Szulaczewski, Edward: *See—*
Kulig, Stanislaw; Goral, Andrzej; Surkow, Wlodzimierz; Szczepanik, Andrzej; and Szulaczewski, Edward, 4,089,663, Cl. 55-276.000.
Tagalakis, Peter; and Woods, James, to Seling Sealing Products, Inc. Venting liner. 4,089,434, Cl. 215-260.000.
Taiheiyo Engineering Inc.: *See—*
Takahashi, Ken; and Inoue, Hideo, 4,089,182, Cl. 61-45.00D.
Takahashi, Ken; and Inoue, Hideo, to Taiheiyo Engineering Inc. Equipment for remotely operating self-advancing supports used at the pit face in a coal mine. 4,089,182, Cl. 61-45.00D.
Takahashi, Souya: *See—*
Mori, Shigeo; Murakami, Fumikazu; Hara, Yoshiaki; Horikoshi, Ichiro; and Takahashi, Souya, 4,090,041, Cl. 179-115.00R.
Takami, Katsumi; Ueda, Ken; Kawaguchi, Fumio; Tomura, Teruichi; and Ishimatsu, Kenji, to Hitachi Medical Corporation. Scintillator for gamma ray camera. 4,090,081, Cl. 250-368.000.
Takamizawa, Minoru; Umemura, Mitsuo; and Kooya, Kazuo, to Shin-Etsu Chemical Co., Ltd. Method of preparing fluoroalkyl-containing organosilanes. 4,089,882, Cl. 260-448.20E.
Takano, Masao: *See—*
Shimiya, Keiji; Miura, Norio; Takano, Masao; and Ishigaki, Kunio, 4,090,085, Cl. 250-483.000.
Takase, Tadayoshi: *See—*
Tamada, Kazumi; Mizuno, Sueo; Takase, Tadayoshi; Koumura, Masahiko; and Soma, Shinichi, 4,089,319, Cl. 126-21.00A.
Takeda Chemical Industries Ltd.: *See—*
Horii, Satoshi; Kameda, Yukihiko; Iwasa, Takashi; and Yamamoto, Hiroichi, 4,089,947, Cl. 424-181.000.
Takeda, Katsuhiko: *See—*
Nagano, Tadashi; Miyao, Saisei; and Takeda, Katsuhiko, 4,089,737, Cl. 162-19.000.
Takeda, Mitsuo: *See—*
Yasutome, Osamu; Takeda, Mitsuo; Mori, Yasumasa; and Sawamura, Tagayasu, 4,090,102, Cl. 313-317.000.
Takiura, Mamoru; Nakajyo, Susumu; Kikuchi, Noriyuki; and Ishida, Masahiko, to Ikegai Tekko Kabushiki Kaisha. Process of cross-linking and extrusion molding thermoplastic polymers. 4,089,917, Cl. 264-40.300.
Tamada, Kazumi; Mizuno, Sueo; Takase, Tadayoshi; Koumura, Masahiko; and Soma, Shinichi. Hot blast type oven. 4,089,319, Cl. 126-21.00A.
Tan, Sing Liong: *See—*
van Buul, Marinus Cornelis Willem; Hofman, Jan August Marcel; van de Polder, Leendert Johan; and Tan, Sing Liong, 4,090,218, Cl. 358-37.000.
Tanabe, Hiroshi: *See—*
Kawabe, Hirokazu; and Tanabe, Hiroshi, 4,089,530, Cl. 274-37.000.
Tanaka, Taro: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,089,310, Cl. 123-119.0LR.
Tanaka, Yukiyasu: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,089,310, Cl. 123-119.0LR.

Tanimoto, Tadao: *See—*
Furuya, Tsutomu; Ayabe, Shinichi; Kobayashi, Miyuki; and Tanimoto, Tadao, 4,089,606, Cl. 536-4.000.

Tapecon, Inc.: *See—*
Pierson, Robert B., 4,090,003, Cl. 428-42.000.

Tasker, G. William: *See—*
French, William George; and Tasker, G. William, 4,089,586, Cl. 350-96.300.

Tateno, Hiroshi; Kataoka, Shoei; Hashizume, Nobuo; and Komamiya, Yasuo, to Agency of Industrial Science & Technology. Transmission line for electromagnetic wave. 4,090,155, Cl. 333-80.00T.

Tatsuno, Hiyoshi, to Tokyo Tatsuno Co., Ltd. Fuel filling system. 4,089,445, Cl. 222-538.000.

Tayakin, Jury Vasilievich: *See—*
Poisky, Jury Mikhailovich; Zakharov, Valentin Petrovich; Golets, Nikolai Trofimovich; Tayakin, Jury Vasilievich; Lipovetsky, Gennady Petrovich; Protsenko, Valery Vasilievich; Khomenko, Alexandr Dmitrievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich, 4,090,246, Cl. 364-736.000.

Tayama, Hiromitsu: *See—*
Kinase, Takeo; Yano, Isamu; Okubo, Kanichi; Kitakoga, Hidetoshi; and Tayama, Hiromitsu, 4,089,178, Cl. 61-1.00F.

Taylor, Allen L., to Minnesota Mining and Manufacturing Company. Strain sensor employing bi layer piezoelectric polymer. 4,089,927, Cl. 310-331.000.

Taylor, Don A. Injection molding method and apparatus. 4,089,926, Cl. 264-294.000.

TDN, Inc.: *See—*
Cranberg, Lawrence, 4,090,086, Cl. 250-499.000.

Teague, Floydale: *See—*
Reineke, Harry W., Jr.; and Teague, Floydale, 4,089,165, Cl. 60-369.000.

Tebbutt, Charles N.; and Still, Charles D. V., to Metal Box Limited. Containers. 4,090,004, Cl. 428-64.000.

Teccor Electronics, Inc.: *See—*
Mason, William B., 4,090,235, Cl. 363-160.000.
Walker, Jerry L.; and Crockett, Charles R., 4,090,167, Cl. 338-172.000.

Teco, Inc.: *See—*
Johnson, Leonard L., 4,089,388, Cl. 182-2.000.

Tedea Technological Development and Automation Ltd.: *See—*
Rahav, Amir; and Raz, Mathy, 4,089,217, Cl. 73-141.00A.

Teed, Richard K., to Riegel Textile Corporation. Workpiece monitoring and control apparatus for a machine having a sequential flow of workpieces. 4,089,728, Cl. 156-352.000.

Teel, Willis A.: *See—*
Adair, Lyles C.; Teel, Willis A.; Werle, Christian P. F.; and Hutton, John A., 4,090,169, Cl. 340-5.00C.

Teledyne McCormick-Selph, an operating division of Teledyne Industries, Inc.: *See—*
Goddard, Terrence P.; Thatcher, Donald N.; and Garrison, Charles G., 4,089,716, Cl. 149-10.000.

Temple, Rodger G., to PPG Industries, Inc. Method of preparing microcapsules. 4,089,800, Cl. 252-316.000.

Templeton, Charles C.: *See—*
Lybarger, James H.; Templeton, Charles C.; Richardson, Edwin A.; and Scheuerman, Ronald F., 4,089,787, Cl. 252-8.55C.

Tenco Hydro/Aerosciences, Inc.: *See—*
Ettelt, Gregory A.; and Cohen, Alfred L., 4,089,784, Cl. 210-526.000.

Teramura, Hiroichi: *See—*
Nakagome, Yukio; Teramura, Hiroichi; Yamazaki, Yasuhiro; and Wakahara, Yasushi, 4,090,222, Cl. 358-280.000.

Terry, Ruel C., to In Situ Technology, Inc. Methods of fluidized production of coal in situ. 4,089,372, Cl. 166-256.000.

Terry, Ruel C., to In Situ Technology, Inc. Producing methane from coal in situ. 4,089,374, Cl. 166-259.000.

Teske, Fritz; and Teske, Lothar. Chain drive. 4,089,406, Cl. 198-730.000.

Teske, Lothar: *See—*
Teske, Fritz; and Teske, Lothar, 4,089,406, Cl. 198-730.000.

Teti, Joseph A., Jr.; and Peroni, Peter A., to LaFrance Precision Casting Company. Instrument housing. 4,089,464, Cl. 220-4.00A.

Tetzlaff, Wolfgang: *See—*
Hendrickson, Thomas E.; Huang, Jack S. T.; and Tetzlaff, Wolfgang, 4,089,103, Cl. 29-577.00C.

Texaco Inc.: *See—*
Cole, Edward L., 4,089,656, Cl. 44-1.00R.
Duranleau, Roger G.; Larkin, John M.; and Newman, Stanley R., 4,089,867, Cl. 260-307.00G.
Haugen, Haakon; and Weetman, David G., 4,089,791, Cl. 252-32.70E.
Koniz, Leon F.; and Estes, John H., 4,089,811, Cl. 252-463.000.
Rigdon, Orville W.; and Macaluso, Anthony, Sr., 4,089,689, Cl. 106-14.280.
Whittle, Joanne R.; and Rigdon, Orville W., 4,089,903, Cl. 260-583.00G.

Texacone Company, The: *See—*
Wheeler, John H., 4,089,137, Cl. 51-241.00S.

Texas Instruments Incorporated: *See—*
Flannigan, James Steven; Shadrick, Dennie Joel; and Scott, Bennett Sanford, 4,090,251, Cl. 365-1.000.
Kilby, Jack S.; Schweitzer, Robert F.; and McCrady, John, 4,090,059, Cl. 219-216.000.

Textron Inc.: *See—*
Becker, Manfred E., 4,089,095, Cl. 29-149.50B.

Tezuka, Chojiro; and Karasawa, Yoshimitsu, to G-C Dental Industrial Corp. Setting solution for dental glass ionomer cements. 4,089,830, Cl. 260-29.60H.

Thatcher, Donald N.: *See—*
Goddard, Terrence P.; Thatcher, Donald N.; and Garrison, Charles G., 4,089,716, Cl. 149-10.000.

Theodossi, Charalambos Georgiou; and Hibbs, David Arthur, to International Telephone & Telegraph Corporation. Manufacture of submarine cable. 4,089,923, Cl. 264-146.000.

Thiele, Gerd; and Schraudolph, Manfred, to Siemens Aktiengesellschaft. Spatial arrangement of the valves of a three-pulse converter system. 4,090,233, Cl. 363-68.000.

Thies, Peter Willibrord; and Asai, Akiji, to Kali-Chemie Pharma GmbH. Pharmaceutically active 2,9-dioxatricyclo[4,3,1,$0^{3,7}$]decanes. 4,089,971, Cl. 424-278.000.

Thomas, George L.; and Woodall, Edward L., Jr., to General Electric Company. Glass composition. 4,089,694, Cl. 106-53.000.

Thomas, Larry A.: *See—*
McMahon, Melvin B.; Guth, Lloyd A.; and Thomas, Larry A., 4,090,088, Cl. 307-38.000.

Thomas, William R., to Baxter Travenol Laboratories, Inc. Rapidly solubilized AHF composition and process for preparing same. 4,089,944, Cl. 424-101.000.

Thompson, Francis T., to Westinghouse Electric Corp. Safety features for electric vehicle control. 4,090,114, Cl. 318-139.000.

Thompson, Paige W., to General Electric Company. Load controller. 4,090,093, Cl. 307-117.000.

Thompson, William Henry; Worthington, Ralph Eric; and Stamper, David John, to Goulding Chemicals Limited. Production of hydrogen fluoride. 4,089,936, Cl. 423-483.000.

Thomson-CSF Laboratories, Inc.: *See—*
Kreinik, Stephen, 4,090,187, Cl. 340-324.0AD.

Thomson, James Farquhar. Blast cleaning apparatus. 4,089,138, Cl. 51-422.000.

Thomson, Ronald E.; and Schmitt, James F., to Madison-Kipp Corporation. Spray coater device. 4,089,295, Cl. 118-316.000.

Thorn Electrical Industries Limited: *See—*
Rees, John Michael; Horler, Christopher Arthur; and Downing, Anthony Peter, 4,090,101, Cl. 313-223.000.

Thyssen Industrie AG: *See—*
Koppers, Manfred, 4,089,181, Cl. 61-45.00D.

Tiggesbaumker, Peter; and Alker, Karl-Heinz, to Polysius AG. Adjustable lifting wall for tube mill. 4,089,477, Cl. 241-78.000.

Timmer, Dana W. Garbage disposal drain protector. 4,089,474, Cl. 241-46.00B.

Tischenko, Alexandr Fedorovich; Yanishevsky, Nisson Meerovich; and Ivanov, Mikhail Alexandrovich. Device for measuring filtering properties of paper pulp. 4,089,210, Cl. 73-63.000.

Titze, Eberhard: *See—*
Gust, Karl; Hankel, Albert; Hasenclever, Horst; and Titze, Eberhard, 4,089,122, Cl. 34-79.000.

Tjaden, Jan, to N.V. Internationale Octrooi Maatschappij "OCTROPA". Heat transfer element. 4,089,324, Cl. 126-271.000.

Toda, Minoru; and Osaka, Susumu, to RCA Corporation. Surface acoustic wave absorber. 4,090,153, Cl. 333-30.00R.

Toeniskoetter, Richard H.; and Spiwak, John J., to Ashland Oil, Inc. Settable composition containing aluminum phosphate and method for preparing same. 4,089,692, Cl. 106-38.350.

Tokumitsu, Ichiro; Konuma, Hideo; Mochizuki, Shigeaki; Morotomi, Kohichi; Murai, Norio; and Koyama, Mikio, to Idemitsu Petrochemical Co. Ltd. Method for producing a polycarbonate oligomer. 4,089,888, Cl. 260-463.000.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Yasutome, Osamu; Takeda, Mitsuo; Mori, Yasumasa; and Sawamura, Tagayasu, 4,090,102, Cl. 313-317.000.

Tokyo Tatsuno Co., Ltd.: *See—*
Tatsuno, Hiyoshi, 4,089,445, Cl. 222-538.000.

Tomatsu, Masanobu: *See—*
Sando, Yoshikazu; Minakata, Matsuo; Ishidoshiro, Hiroshi; Tomatsu, Masanobu; and Kamei, Isao, 4,089,194, Cl. 68-5.00E.

Tomura, Teruichi: *See—*
Takami, Katsumi; Ueda, Ken; Kawaguchi, Fumio; Tomura, Teruichi; and Ishimatsu, Kenji, 4,090,081, Cl. 250-368.000.

Tomy Kogyo Co., Inc.: *See—*
Usami, Hikoo, 4,089,529, Cl. 273-282.000.

Topham, William Sanford: *See—*
Couvillon, Lucien Alfred, Jr.; Grover, Thomas Reaks; Baker, Charles Dewitt; and Topham, William Sanford, 4,089,329, Cl. 128-2.00T.

Toppen, Harvey R.; Loersch, Joseph F.; Paulonis, Daniel F.; and Lowrey, O. Preston, Jr., to United Technologies Corporation. Controlled-pressure diffusion bonding and fixture therefor. 4,089,456, Cl. 228-195.000.

Torregrosa, Michel: *See—*
Presset, Rene; and Torregrosa, Michel, 4,090,151, Cl. 331-66.000.

Torseng, Sture Ragnar: *See—*
Fahlen, Nils Torsten; Samuelsson, Jan; and Torseng, Sture Ragnar, 4,090,226, Cl. 361-16.000.

Tosswill, Christopher H., to Galileo Electro-Optics Corp. Imaging. 4,090,080, Cl. 250-366.000.

Tow, Russell P.: *See—*
Canty, Eugene T.; Tow, Russell P.; Spayth, Frank J.; Morrow, Richard A.; and Smith, Charlie B., 4,090,198, Cl. 343-18.00D.

Towmotor Corporation: *See—*
Balchick, Elmer, 4,089,386, Cl. 180-64.00R.
Townsend, Wesley Peter, to Western Electric Company, Inc. Method of depositing a metal on a surface. 4,089,686, Cl. 96-35.100.
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Toyo Pulp Company, Ltd.: *See—*
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Tragesser, Charles W.; Vaill, Ronald E.; Bohinc, Richard J.; and Racki, Francis R., to Westinghouse Electric Corp. Tank-type oil circuit-interrupter with jet forces counterbalancing the magnetic forces. 4,090,052, Cl. 200-150.00R.
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Van Voorhis, David Curtis, to International Business Machines Corporation. Method and apparatus for accessing horizontal sequences, vertical sequences and rectangular subarrays from an array stored in a modified word organized random access memory system. 4,090,174, Cl. 340-146.3MA.
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Villarreal, Rudy G. Sunshade for telescopic sights. 4,089,117, Cl. 33-244.000.
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Ziemek, Peter; Raue, Roderich; and Buysch, Hans-Josef, to Bayer Aktiengesellschaft. Process for converting polyaminopolyarylmethanes into diaminodiarylmethanes. 4,089,901, Cl. 260-570.00D.

Zimmerman, Richard Henry, to AMP Incorporated. Method of forming complex shaped metal-plastic composite lead frames for IC packaging. 4,089,733, Cl. 156-630.000.

Zin-Plas Corporation: *See*—
Nelson, Merritt J., 4,089,230, Cl. 74-97.000.

Zlaikha, Eliyahu. Workpiece holder and feeder device for band saws and other machines. 4,089,428, Cl. 214-1.500.

Zlaikha, Eliyahu. Automatic strip-feeder device particularly for dies. 4,089,451, Cl. 226-136.000.

Zrinyi, Nicolaus H. Aerosol, spray-dispensing apparatus. 4,089,443, Cl. 222-386.500.

Zucchini, Umberto; and Cuffiani, Illaro, to Montedison S.p.A. Catalysts for the polymerization of olefins, method of preparing the same. 4,089,808, Cl. 252-429.00C.

Zucker, Friedrich J., to Supraton F. J. Zucker KG. Mixing and comminuting machine for treating liquid-solid mixtures. 4,089,475, Cl. 241-46.060.

Zust, Armin: *See*—
Gosteli, Jacques; Storni, Angelo; and Zust, Armin, 4,089,960, Cl. 424-266.000.

Zwieg, Robert L.: *See*—
Bergman, Charles T.; and Zwieg, Robert L., 4,089,151, Cl. 53-59.00R.

Zwijsen, Wilhelmus Antonius Joseph Marie: *See*—
Kroner, Klaus; and Zwijsen, Wilhelmus Antonius Joseph Marie, 4,090,124, Cl. 323-19.000.

LIST OF REISSUE PATENTEES

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NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Burlington Industries, Inc.: *See—*
May, Robert Edward, Re. 29,630, Cl. 5-345.00R.

Canon Kabushiki Kaisha: *See—*
Tanaka, Hiroshi; Takahashi, Shinkichi; Hasegawa, Tetsuo; and Sato, Toshihiko, Re. 29,632, Cl. 355-11.000.

Colgate Palmolive Company: *See—*
Roberts, Francis D.; and Steinke, John J., III, Re. 29,634, Cl. 424-57.000.

Hasegawa, Tetsuo: *See—*
Tanaka, Hiroshi; Takahashi, Shinkichi; Hasegawa, Tetsuo; and Sato, Toshihiko, Re. 29,632, Cl. 355-11.000.

MacMillan, Kenneth T. Mechanism for maintaining alignment between two relatively movable members. Re. 29,633, Cl. 425-25.000.

May, Robert Edward, to Burlington Industries, Inc. Fire resistant fabrics. Re. 29,630, Cl. 5-345.00R.

Roberts, Francis D.; and Steinke, John J., III, to Colgate Palmolive Company. Dentifrice containing visible agglomerated particles of polishing agents. Re. 29,634, Cl. 424-57.000.

Sato, Toshihiko: *See—*
Tanaka, Hiroshi; Takahashi, Shinkichi; Hasegawa, Tetsuo; and Sato, Toshihiko, Re. 29,632, Cl. 355-11.000.

Schott, Lawrence A. Infinitely variable transmission with lubricating wick means. Re. 29,631, Cl. 74-198.000.

Steinke, John J., III: *See—*
Roberts, Francis D.; and Steinke, John J., III, Re. 29,634, Cl. 424-57.000.

Takahashi, Shinkichi: *See—*
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Tanaka, Hiroshi; Takahashi, Shinkichi; Hasegawa, Tetsuo; and Sato, Toshihiko, to Canon Kabushiki Kaisha. Electrophotographic device. Re. 29,632, Cl. 355-11.000.

LIST OF PLANT PATENTEES

Arnold, Elizabeth R. Plant of the fern family. 4,253, 5-16-78, Cl. 88.000.

Iwasaki, Satoru. Chrysanthemum plant named Imperial White. 4,251, 5-16-78, Cl. 77.000.

Pan-American Plant Company: *See—*
Petusky, Kerry S., 4,252, Cl. 78.000.

Petusky, Kerry S., to Pan-American Plant Company. Chrysanthemum plant named Topaz. 4,252, 5-16-78, Cl. 78.000.

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American Cyanamid Company: *See—*
Grodin, Adam J., 247,873, Cl. D9-64.000.

American Optical Corporation: *See—*
Johnsen, David W., 247,910, Cl. D16-65.000.

Anchor Hocking Corporation: *See—*
Thrush, James Lloyd, 247,867, Cl. D7-14.000.

Astro-Nomical Industries, Inc.: *See—*
O'Donnell, James M., 247,894, Cl. D13-12.000.

Baldwin, Maurice F.: *See—*
Whitney, Thomas Michael; Crosby, Samuel C.; and Baldwin, Maurice F., 247,913, Cl. D23-65.000.

Baron, Anthony. Toy animal. 247,917, 5-16-78, Cl. D34-2.00R.

Bartz, Steven C. Toy projectile. 247,923, 5-16-78, Cl. D34-15.0PP.

Bennett, Brian Sidney, to Dunlop Limited. Tire. 247,891, 5-16-78, Cl. D12-146.000.

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Britt, William J., to Morton-Norwich Products, Inc. Funnel. 247,868, 5-16-78, Cl. D7-68.000.

Cannon, Lee E.; and Mansfield, Amos R., to Summit Engineering Company. Control console. 247,896, 5-16-78, Cl. D13-32.000.

Chapa, Lucio, III. Corn detasseler. 247,903, 5-16-78, Cl. D15-102.000.

Chapa, Lucio, III. Corn detasseler. 247,904, 5-16-78, Cl. D15-102.000.

Covey, Laird Fortune, to Stanley Works, The. Tape rule blade. 247,878, 5-16-78, Cl. D10-71.000.

Crosby, Samuel C.: *See—*
Whitney, Thomas Michael; Crosby, Samuel C.; and Baldwin, Maurice F., 247,913, Cl. D23-65.000.

Crowley, Henry J.: *See—*
Garson, Howard P.; and Crowley, Henry J., 247,876, Cl. D9-219.000.

Current, Wayne Allen, to Singer Company, The. Circular knitting machine. 247,900, 5-16-78, Cl. D15-66.000.

Dart Industries Inc.: *See—*
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Dunlop Limited: *See—*
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Kawakami, Masafumi, 247,892, Cl. D12-151.000.

Dykehouse, Robert H. Bowling pin core. 247,920, 5-16-78, Cl. D34-5.0GP.

Ellenburg, Howard, to Trumark Manufacturing Co., Inc. Slingshot. 247,911, 5-16-78, Cl. D22-4.000.

Erl, George M. Tensioning device for motorcycle drive chain. 247,906, 5-16-78, Cl. D15-148.000.

Foam Molding Corporation of Iowa: *See—*
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Fresard, Marcel, to Mefina S.A. Portable sewing machine. 247,901, 5-16-78, Cl. D15-70.000.

Fudman, Israel. Ice shaving machine. 247,902, 5-16-78, Cl. D15-101.000.

Garson, Howard P.; and Crowley, Henry J. Packaging tray. 247,876, 5-16-78, Cl. D9-219.000.

General Electric Company: *See—*
Gillette, Stephen F., 247,895, Cl. D13-30.000.

Gillette, Stephen F., to General Electric Company. Portable ground fault circuit interrupter. 247,895, 5-16-78, Cl. D13-30.000.

Glaser, Ilma R. Hand bag or similar article. 247,930, 5-16-78, Cl. D87-3.00D.

Gleichert, Arthur A. Container for a diabetic's equipment. 247,928, 5-16-78, Cl. D87-1.00R.

Goldberg, Gerry G. Cigarette lighter pouch. 247,921, 5-16-78, Cl. D27-51.000.

Goyette, Armand J., Jr. Weighted golf club practice device. 247,919, 5-16-78, Cl. D34-5.0CB.

Grodin, Adam J., to American Cyanamid Company. Decanter. 247,873, 5-16-78, Cl. D9-64.000.

Herrmeyer, Vernon H.; and Paulson, Jane H. Vegetable peeler. 247,870, 5-16-78, Cl. D7-147.000.

Hettinga, Siebolt, to Foam Molding Corporation of Iowa. Square. 247,877, 5-16-78, Cl. D10-62.000.
Hitchens, Doreen M. Separable charm. 247,881, 5-16-78, Cl. D11-41.000.
Jepson, John W.: *See*—
Delano, Ralph L.; Rambo, Charles D.; and Jepson, John W., 247,918, Cl. D34-5.0GH.
Johnsen, David W., to American Optical Corporation. Pair of spectacles. 247,910, 5-16-78, Cl. D16-65.000.
Kawakami, Masafumi, to Dunlop Limited. Tire. 247,892, 5-16-78, Cl. D12-151.000.
Kesling, Peter C. Handle for attachment to a dental impression tray. 247,916, 5-16-78, Cl. D24-16.000.
Kinney, Alfred W., to Phillips Petroleum Company. Closure or similar article. 247,875, 5-16-78, Cl. D9-267.000.
Krecic, Elda, to Monet Jewelers, Inc. Pendant or similar article. 247,883, 5-16-78, Cl. D1182-.
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Lahay, Charles A., to Dart Industries Inc. Medical suction instrument. 247,915, 5-16-78, Cl. D24-8.000.
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Lawrence, William James: *See*—
Sulek, Eugene Joseph; and Lawrence, William James, 247,927, Cl. D64-11.00B.
Little, Jack M., Jr. Flashlight. 247,925, 5-16-78, Cl. D48-24.00A.
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O'Donnell, James M., to Astro-Nomical Industries, Inc. Electric power distribution unit. 247,894, 5-16-78, Cl. D13-12.000.
Okland, Merlyn C. Vehicle running board. 247,893, 5-16-78, Cl. D12-203.000.
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Herrmeyer, Vernon H.; and Paulson, Jane H., 247,870, Cl. D7-147.000.
Phillips Petroleum Company: *See*—
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Plomp, Herman; and Lucas, Jan Hendrik, to Varel B.V. Automatic telephone dialing unit. 247,898, 5-16-78, Cl. D14-58.000.
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Satterfield, James C. Tire refinishing apparatus. 247,907, 5-16-78, Cl. D15-199.000.
Shaw, Leslie Ralph; and Morris, Barry Stanley, to Bloxwich Lock and Stamping Company Limited, The. Cam for a fastening mechanism for container doors. 247,871, 5-16-78, Cl. D8-343.000.
Sheldon, John Charles. Golf wood head. 247,922, 5-16-78, Cl. D34-5.0GH.
Sickul, Joan B. Vase. 247,890, 5-16-78, Cl. D11-146.000.
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Wiggins, William H. Fireplace. 247,914, 5-16-78, Cl. D23-97.000.
Wynn, Larry R., to Luce Industries, Inc. Console for motor cover of a motor vehicle. 247,929, 5-16-78, Cl. D87-1.00R.
Yamanaka, Senya. Aquatic sled. 247,924, 5-16-78, Cl. D34-42.000.
Zimmerman, Donald E. Pendant. 247,882, 5-16-78, Cl. D1101-.

CLASSIFICATION OF PATENTS

ISSUED MAY 16, 1978

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26 4,089,284
74 A 4,089,285
140 4,089,286
144 B 4,089,287
309 4,089,288

CLASS 115

41 HT 4,089,289
41 R 4,089,290
70 4,089,291

CLASS 116

133 4,089,292

CLASS 118

7 4,089,293
230 4,089,294
316 4,089,295
413 4,089,296
647 4,089,297

CLASS 119

2 4,089,298
51 R 4,089,299
52 AF 4,089,300
60 4,089,301

CLASS 122

225 R 4,089,302
250 R 4,089,303
412 4,089,304

CLASS 123

32 K 4,089,306
97 B 4,089,307
119 B 4,089,309
119 D 4,089,312
119 EC 4,089,311
4,089,313
119 LR 4,089,310
119 R 4,089,308
133 4,089,314
139 AK 4,089,315
146.5 A 4,089,316
179 L 4,089,317
200 4,089,162
244 4,089,305

CLASS 124

16 4,089,318

CLASS 126

21 A 4,089,319
121 4,089,320
215 4,089,321
261 4,089,322
270 4,089,323
271 4,089,324
4,089,325
4,089,326
299 D 4,089,327
4,089,328

CLASS 127

61 4,089,701

CLASS 128

2 T 4,089,329
25 R 4,089,330
132 D 4,089,331
152 4,089,332
156 4,089,333
173 H 4,089,334
218 P 4,089,335
303.1 4,089,336
348 4,089,337

CLASS 131

237 4,089,338

CLASS 134

1 4,089,702
22 C 4,089,703
29 4,089,704
73 4,089,339

CLASS 136

89 P 4,089,705

CLASS 137

13 4,089,340
68 R 4,089,341
102 4,089,342
484.8 4,089,343
491 4,089,344
596.13 4,089,346
596.2 4,089,345
625.41 4,089,347
856 4,089,348
859 4,089,349

CLASS 138

45 A 4,089,350
109 4,089,351

CLASS 140

93.2 4,089,352

CLASS 141

302 4,089,353

CLASS 144

178 4,089,354
309 R 4,089,355

CLASS 145

29 R 4,089,356
50 A 4,089,357

CLASS 148

2 4,089,706
6.14 R 4,089,707
6.15 R 4,089,708
6.15 Z 4,089,710
6.27 4,089,709
11.5 R 4,089,711
175 4,089,712
178 4,089,713
188 4,089,714

CLASS 149

6 4,089,715
10 4,089,716

CLASS 150

.5 4,089,358

CLASS 152

216 4,089,359
330 R 4,089,360

CLASS 156

72 4,089,717
122 4,089,718
171 4,089,719
181 4,089,720
212 4,089,721
235 4,089,722
246 4,089,723
277 4,089,724
299 4,089,725

306 4,089,726
350 4,089,727
352 4,089,728
498 4,089,729
541 4,089,730
555 4,089,731
580 4,089,732
612 4,089,735
630 4,089,733
656 4,089,734
665 4,089,736

CLASS 160

120 4,089,361

CLASS 162

19 4,089,737
206 4,089,738
304 4,089,740
343 4,089,739

CLASS 164

7 4,089,362
16 4,089,363
363 4,089,364

CLASS 165

1 4,089,365
4,089,366
61 4,089,367
139 4,089,368
158 4,089,369
159 4,089,370

CLASS 166

242 4,089,371
256 4,089,372
4,089,373
259 4,089,374
261 4,089,375
293 4,089,376
315 4,089,377

CLASS 169

54 4,089,378

CLASS 172

370 4,089,379

CLASS 173

133 4,089,380

CLASS 174

14 R 4,090,028
51 4,090,029
153 A 4,090,030

CLASS 175

4.6 4,089,381
361 4,089,382

CLASS 176

78 4,089,742
4,089,743
87 4,089,741
4,089,744

CLASS 179

1 AT 4,090,033
1 CN 4,090,032
7.1 R 4,090,034
15 BO 4,090,035
15 BY 4,090,036
90 AN 4,090,037
99 4,090,038
100.41 D 4,090,039
107 FD 4,090,040
115 R 4,090,041
156 A 4,090,042
170 NC 4,090,043
185 4,090,044

CLASS 180

43 R 4,089,383
44 E 4,089,384
64 R 4,089,385
4,089,386
76 4,089,387

CLASS 182

2 4,089,388
178 4,089,389
206 4,089,390

CLASS 187

12 4,089,391

CLASS 188

71.4 4,089,392
72.6 4,089,393

CLASS 192

4 A 4,089,394
41 A 4,089,395
56 F 4,089,396
096 4,089,397
114 R 4,089,398

CLASS 193

35 SS 4,089,399

CLASS 194

97 A 4,089,400

CLASS 195

33 4,089,745
63 4,089,746
99 4,089,747
104 4,089,748

CLASS 198

316 4,089,403
365 4,089,404
475 4,089,405
730 4,089,406
815 4,089,407
848 4,089,408

CLASS 200

5 A 4,090,045
44 4,090,046
48 P 4,090,047
83 N 4,090,048
84 C 4,090,049
4,090,050
144 R 4,090,051
150 R 4,090,052
241 4,090,053

CLASS 202

176 4,089,749
180 4,089,750

CLASS 203

74 4,089,751
99 4,089,752

CLASS 204

23 4,089,753
43 T 4,089,754
55 R 4,089,755
58 4,089,756
78 4,089,757
98 4,089,758
4,089,759
109 4,089,760
149 4,089,761
159.15 4,089,762
159.23 4,089,763
162 R 4,089,764
180 R 4,089,765
192 D 4,089,766
197 4,089,767
228 4,089,768
245 4,089,769
247 4,089,770
284 4,089,771

CLASS 206

63.3 4,089,409
4,089,410
300 4,089,411
314 4,089,412
382 4,089,413
444 4,089,414
484.2 4,089,415
582 4,089,416
600 4,089,417
632 4,089,418
4,089,419

CLASS 208

8 4,089,772
4,089,773
89 4,089,774
111 4,089,775

CLASS 209

5 4,089,776
80 4,089,420
97 4,089,421
137 4,089,422
259 4,089,777

CLASS 210

23 F 4,089,778
42 S 4,089,779
53 4,089,780
67 4,089,781
206 4,089,782
358 4,089,783
526 4,089,784

CLASS 211

64 4,089,423

CLASS 212

4 4,089,424

CLASS 214

1 CM 4,089,427
1 H 4,089,426
1 HH 4,089,425
1.5 4,089,428
35 R 4,089,429
86 A 4,089,430
146 R 4,089,431
304 4,089,435

CLASS 215

6 4,089,432
218 4,089,433
260 4,089,434
329 4,089,463

CLASS 219

10.49 R 4,090,054
10.55 R 4,090,055
121 EB 4,090,056
122 4,090,057
156 4,090,058
216 4,090,059
4,090,060
369 4,090,061
486 4,090,062

CLASS 220

4 A 4,089,464
334 4,089,467
400 4,089,465
441 4,089,468
454 4,089,466

CLASS 222

70 4,089,436
94 4,089,437
146 C 4,089,438
167 4,089,439
174 4,089,440
193 4,089,441
321 4,089,442
386.5 4,089,443
400.7 4,089,444
538 4,089,445
609 4,089,446

CLASS 224

25 A 4,089,447
42.03 B 4,089,448
42.24 4,089,449

CLASS 226

127 4,089,450
136 4,089,451
157 4,089,452

CLASS 228

154 4,089,453
173 A 4,089,454
178 4,089,455
195 4,089,456

CLASS 229

15 4,089,457
32 4,089,458
87.2 4,089,459

CLASS 232

34 4,089,460

CLASS 235

92 AC 4,090,063
92 MT 4,090,064

CLASS 236

42 4,089,461
68 B 4,089,462

CLASS 239

287 4,089,469
304 4,089,470
381 4,089,471

CLASS 241

5 4,089,472
41 4,089,473
46 B 4,089,474
46.06 4,089,475
70 4,089,476
78 4,089,477
167 4,089,478

CLASS 242

2 4,089,479
18 DD 4,089,480
55.53 4,089,481
58.1 4,089,482
71.4 4,089,483
77.1 4,089,484
77.2 4,089,485
129 4,089,486
181 4,089,490
186 4,089,487
192 4,089,488
204 4,089,489

CLASS 244

1 R 4,089,491
30 4,089,492
135 R 4,089,493
178 4,089,494

CLASS 246

34 R 4,089,495

CLASS 248

56 4,089,496
345.1 4,089,497
346.1 4,089,498
376 4,089,499
429 4,089,500

CLASS 249

171 4,089,501
177 4,089,502

CLASS 250

199 4,090,066
4,090,067
201 4,090,068
4,090,069
203 R 4,090,070
238 4,090,071
255 4,090,072
273 4,090,073
4,090,074
282 4,090,075
305 4,090,076
311 4,090,077
343 4,090,078
360 4,090,079
366 4,090,080
368 4,090,081
375 4,090,082
390 4,090,083
439 R 4,090,084
483 4,090,085
499 4,090,086
519 4,090,087

CLASS 251

65 4,089,503
86 4,089,504
133 4,089,505
196 4,089,506

CLASS 252

8.1 4,089,785
8.55 C 4,089,787
8.55 D 4,089,788
8.55 E 4,089,789
8.8 4,089,786
18 4,089,790
32.7 E 4,089,791
4,089,792
4,089,793
51.5 A 4,089,794
135 4,089,795
181 4,089,796
188 4,089,798
188.3 CL 4,089,797
301.4 H 4,089,799
316 4,089,800
4,089,801
4,089,802
344 4,089,803
355 4,089,804
373 4,089,805
413 4,089,806
415 4,089,807
429 C 4,089,808
459 4,089,809
462 4,089,810
463 4,089,811
466 J 4,089,812
520 4,089,813
522 4,089,814

CLASS 260

2 R 4,089,815
2.2 R 4,089,816
2.5 HA 4,089,818
2.5 N 4,089,819
5 4,089,820
8 4,089,821
18 TN 4,089,822
23 EP 4,089,823
27 BB 4,089,824
27 R 4,089,825
29.15 B 4,089,833
29.2 EP 4,089,826
29.4 R 4,089,827
29.4 UA 4,089,834
29.6 H 4,089,830
29.6 SQ 4,089,831
29.6 T 4,089,829
29.6 TA 4,089,828
29.6 WA 4,089,832
31.6 4,089,835
37 N 4,089,836
38 4,089,837
40 R 4,089,838
45.75 C 4,089,842
45.8 NT 4,089,839
45.8 SN 4,089,841
46.5 R 4,089,840
65 4,089,843
77.5 CR 4,089,844
78 A 4,089,845
78 TF 4,089,846
79.1 4,089,847
112 R 4,089,848
158 4,089,849
4,089,850
160 4,089,851
239.55 R 4,089,852
282 4,089,854
285 4,089,855
285.5 4,089,862
290 P 4,089,863
293.53 4,089,856
293.56 4,089,857
293.62 4,089,864
295 R 4,089,858
302 D 4,089,874
302 H 4,089,865
304 C 4,089,866
307 G 4,089,867
308 B 4,089,868
326.1 4,089,875
327 M 4,089,876
332.3 R 4,089,877
343.5 4,089,869
346.75 4,089,870
347.8 4,089,871
365 4,089,872
396 K 4,089,873
408 4,089,878
410.7 4,089,879
424 4,089,880
429 R 4,089,881
448.2 E 4,089,882
448.2 N 4,089,884
448.8 R 4,089,883
4,089,885
450 4,089,886
454 4,089,887
463 4,089,888
464 4,089,889
465.8 D 4,089,890
502 R 4,089,892
502.4 R 4,089,893
507 R 4,089,894
509 4,089,895
514 D 4,089,896
4,089,897
4,089,898
553 R 4,089,899
559 AT 4,089,900
570 D 4,089,901
570.9 4,089,902
583 G 4,089,903
607 AR 4,089,904
609 R 4,089,905
4,089,906
610 B 4,089,907
613 D 4,089,908
650 R 4,089,909
836 4,089,910
859 PV 4,089,911
862 4,089,912
880 B 4,089,913

CLASS 261

34 A 4,089,914
39 R 4,089,915
153 4,089,916

CLASS 264

40.3 4,089,917
40.7 4,089,918
46.6 4,089,919
63 4,089,920
4,089,921
108 4,089,922
146 4,089,923
157 4,089,924
256 4,089,925
294 4,089,926

CLASS 267

8 R 4,089,511
65 R 4,089,512

CLASS 269

96 4,089,513

CLASS 270

94 4,089,514

CLASS 271

3 4,089,515
9 4,089,516
13 4,089,517
167 4,089,518

CLASS 272

105 4,089,519
122 4,089,528
136 4,089,520

CLASS 273

29 A 4,089,521
30 4,089,522
73 R 4,089,523
85 G 4,089,524
101 4,089,525
110 4,089,526
249 4,089,527
282 4,089,529

CLASS 274

37 4,089,530

CLASS 277

92 4,089,531
129 4,089,532
152 4,089,533
188 A 4,089,534
236 4,089,535

CLASS 280

11.28 4,089,536
154.5 R 4,089,537
166 4,089,538
179 R 4,089,539
259 4,089,540
631 4,089,541
639 4,089,542
647 4,089,543
709 4,089,544
751 4,089,545

CLASS 282

27.5 4,089,546
4,089,547

CLASS 285

3 4,089,548
137 R 4,089,549
276 4,089,550

CLASS 292

260 4,089,551

CLASS 294

1 CA 4,089,552
19 R 4,089,553

CLASS 296

24 A 4,089,554
28 M 4,089,555
78.1 4,089,556
137 F 4,089,557
137 R 4,089,558

CLASS 297

201 4,089,559
441 4,089,560

CLASS 299

83 4,089,561
94 4,089,562

CLASS 302

35 4,089,563

CLASS 303

109 4,089,564

CLASS 305

45 4,089,565

CLASS 307

38 4,090,088
40 4,090,089
87 4,090,090
116 4,090,091
4,090,092
117 4,090,093
132 M 4,090,094
221 D 4,090,095
269 4,090,096

CLASS 308

3 R 4,089,566
3.6 4,089,567
3.8 4,089,568
184 R 4,089,569
194 4,089,570

CLASS 310

27 4,090,097
71 4,090,098
168 4,090,099
331 4,089,927

CLASS 312

1 4,089,571
27 4,089,572
4,089,573
108 4,089,574

CLASS 313

220 4,090,100
223 4,090,101
317 4,090,102
330 4,090,103
422 4,090,104

CLASS 315

74 4,090,105
107 4,090,106
156 4,090,107
158 4,090,108
169 TV 4,090,109
368 4,090,110

411 4,090,111

CLASS 318

128 4,090,112
139 4,090,114
282 4,090,113
341 4,090,115
345 E 4,090,116
365 4,090,117
392 4,090,118
432 4,090,119
567 4,090,120
610 4,090,121

CLASS 320

6 4,090,122

CLASS 323

8 4,090,123
19 4,090,124

CLASS 324

15 4,090,125
57 SS 4,090,126
62 4,090,127
71 CP 4,090,128
4,090,129
126 4,090,130
146 4,090,131
158 D 4,090,132
186 4,090,133

CLASS 325

15 4,090,134
28 4,090,135
38 B 4,090,136
60 4,090,137
163 4,090,138
451 4,090,139

CLASS 328

65 4,090,140
129 4,090,141
132 4,090,142
134 4,090,143
150 4,090,144

CLASS 329

1 4,090,145

CLASS 330

2 4,090,146
10 4,090,147
207 P 4,090,148
293 4,090,149
302 4,090,150

CLASS 331

66 4,090,151
102 4,090,152

CLASS 333

30 R 4,090,153
32 4,090,154
80 T 4,090,155

CLASS 335

6 4,090,156
8 4,090,157
17 4,090,158
173 4,090,159
179 4,090,160
281 4,090,161
289 4,090,162

CLASS 337

102 4,090,163
159 4,090,164
360 4,090,165
4,090,166

CLASS 338

172 4,090,167

CLASS 339

17 CF 4,089,575
18 P 4,089,576
4,089,577
21 R 4,089,578
91 R 4,089,579
99 R 4,089,580
176 MP 4,089,581

CLASS 340

3 T 4,090,168
5 C 4,090,169
5 R 4,090,170
8 FT 4,090,171
58 4,090,172
146.1 BA 4,090,173
146.3 MA 4,090,174
164 R 4,090,175
189 M 4,090,176
227 R 4,090,177
237 S 4,090,178
242 4,090,179
261 4,090,180
271 4,090,181
274 R 4,090,182
280 4,090,183
310 A 4,090,184
321 4,090,185
4,090,186
324 AD 4,090,187
4,090,188
335 4,090,189
347 AD 4,090,191
347 DD 4,090,190
347 NT 4,090,192
412 4,090,193
414 4,090,194

CLASS 343

5 PD 4,090,195
5 R 4,090,196
16 M 4,090,197
18 D 4,090,198
100 SA 4,090,199
106 R 4,090,200
117 R 4,090,201
713 4,089,817
4,090,202
753 4,090,203
754 4,090,204

CLASS 346

75 4,090,205
107 R 4,090,206

CLASS 350

96.13 4,089,582
96.15 4,089,583
96.16 4,089,584
96.23 4,089,585
96.30 4,089,586
125 4,089,587
162 SF 4,089,589
187 4,089,590
214 4,089,591
235 4,089,592
236 4,089,593
262 4,089,594
294 4,089,595
350 4,089,588

CLASS 352

27 4,089,596
53 4,089,597

CLASS 353

17 4,089,598
70 4,089,599

CLASS 354

23 D 4,090,207
25 4,090,209
38 4,090,208
86 4,090,211

CLASS 355

3 CH 4,089,600
11 Re.29,632
14 4,089,601
69 4,089,602
73 4,089,603
74 4,089,604
77 4,089,605

CLASS 356

109 4,089,607
156 4,089,608

CLASS 357

24 4,090,212
30 4,090,213

CLASS 358

4 4,090,214
8 4,090,215
21 4,090,216
37 4,090,217
4,090,218
59 4,090,219
86 4,090,220
130 4,090,031
166 4,090,221
280 4,090,222

CLASS 360

35 4,090,223
60 4,090,224

CLASS 361

3 4,090,225
16 4,090,226
57 4,090,227
86 4,090,228
288 4,090,229
345 4,090,230
433 4,090,231

CLASS 362

106 4,090,232
419 4,090,210

CLASS 363

68 4,090,233
88 4,090,234
160 4,090,235

CLASS 364

200 4,090,236
4,090,237
4,090,238
4,090,239
300 4,090,240
473 4,090,241
494 4,090,065
514 4,090,242
526 4,090,243
603 4,090,244
712 4,090,245
736 4,090,246
900 4,090,247
4,090,248
4,090,249
4,090,250

CLASS 365

1 4,090,251
2 4,090,252
128 4,090,253
150 4,090,254
154 4,090,255
4,090,256
184 4,090,257
4,090,258
191 4,090,259
237 4,090,260

CLASS 366

7 4,089,508
8 4,089,509
83 4,089,510
4,090,261
102 4,089,507
155 4,090,262
273 4,090,263

CLASS 400

125.1 4,089,401
625 4,089,402

CLASS 401

130 4,089,609

CLASS 403

1 4,089,610
358 4,089,611
361 4,089,612
388 4,089,613
407 4,089,614

CLASS 404

6 4,089,615
117 4,089,616

CLASS 415

163 4,089,617

CLASS 416

228 4,089,618

CLASS 417

54 4,089,619
61 4,089,620
118 4,089,621
188 4,089,622
295 4,089,623
362 4,089,624
431 4,089,626
440 4,089,625

CLASS 423

49 4,089,928
118 4,089,929
239 4,089,930
290 4,089,931
338 4,089,932
446 4,089,933
448 4,089,934
474 4,089,935
483 4,089,936
490 4,089,937
579 4,089,938
648 R 4,089,939
4,089,940
654 4,089,941

CLASS 424

47 4,089,942
49 4,089,943
57 Re.29,634
101 4,089,944
164 4,089,945
177 4,089,946
181 4,089,947
229 4,089,948
4,089,949
4,089,950
232 4,089,951
243 4,089,952
244 4,089,953
245 4,089,954
246 4,089,955
248.53 4,089,956
248.56 4,089,957
250 4,089,958
253 4,089,959
266 4,089,960
267 4,089,961
269 4,089,962
270 4,089,963
4,089,964
4,089,965
272 4,089,966
273 R 4,089,967
4,089,968
274 4,089,969
275 4,089,970
278 4,089,971
288 4,089,972
304 4,089,973
319 4,089,974
322 4,089,975
4,089,976
329 4,089,977

CLASS 425

25 Re.29,633
303 4,089,627

CLASS 426

32 4,089,978
69 4,089,979
4,089,980
104 4,089,981
107 4,089,982
250 4,089,983
293 4,089,984
487 4,089,985
538 4,089,986
564 4,089,987
578 4,089,988

CLASS 427

2 4,089,989
38 4,089,990
75 4,089,991
94 4,089,992
129 4,089,993
140 4,089,994
157 4,089,995
160 4,089,996
171 4,089,997
182 4,089,998
385 R 4,089,999
393 4,090,000
444 4,090,001

CLASS 428

36 4,090,002
42 4,090,003
64 4,090,004
76 4,090,005
81 4,090,006
159 4,090,007
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